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The Value of Iowa School District Community Demographic Data in Explaining School District ITBS/ITED 3rd and 11th Grade Language Arts and Mathematics Scores

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Abstract

The purpose of this study was to determine which combination of 15 community demographic factors account for the most amount of variance and can best predict an Iowa school district's percentage of students scoring proficient or above on the 2010 Iowa Test of Basic Skills (ITBS) and Iowa Test of Educational Development (ITED) for 3rd and 11th grade Language Arts and Mathematics. This study, along with extant literature and past research, supports the hypothesis that community demographic factors have an impact on state standardized test scores.

This study revealed that 20.4% of the variance in 2010 ITBS 3rd grade Language Arts scores can be explained by community demographic variables; 12.2% of the variance in 2010 ITBS 3rd grade Mathematics scores can be explained by community demographic variables; 20.3% of the variance in 2010 ITED 11th grade Language Arts scores can be explained by community demographic variables; 23.6% of the variance in 2010 ITED 11th grade Mathematics scores can be explained by community demographic variables. Using only community demographic factors, this study successfully predicted as much as 73% (11th grade Language Arts) of the actual 2010 ITBS/ITED scores and as much as 69% (11th grade Mathematics) of the actual 2010 ITBS/ITED scores. The results of this study add to the growing body of research that community demographic factors influence student achievement results.

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To my family, my students, and mentors: This is all a result of how you have molded me over time. I am thankful to love what I do for a living. I am an educator who has no doubt about this bit of self-identity. As I approach the end of my fifteenth year, I remain humble and excited about what the next fifteen years might bring.

Table of Contents

List of Tables

List of Figures

CHAPTER I

INTRODUCTION

Political pressure has thrust education policy to the forefront of national agendas and in doing so has created the rather divisive climate reflected across states today. The state of Iowa has not been sheltered from such pressure, and the last two legislative sessions witnessed substantial education reform bills introduced by the governor. Not unlike many of the reforms taking shape in other states, Iowa recently enacted laws that focus tightly on levers of accountability. The levers represent a ratcheting up of the high-stakes nature being placed on standardized assessments. As a result of the mounting pressure to make substantial education reforms, the Iowa Legislature passed two bills emphasizing greater accountability: (1) Senate File 2284 passed in 2012 instituted an early literacy progression that includes the possibility of third grade retention, and (2) House File 215 passed in 2013 instituted attendance center performance rankings meant to rank all schools in Iowa in accordance with a series of multiple measures.

Beginning May 1, 2017, a student deficient in reading, as measured by a Department of Education-approved early warning system or statewide accountability assessments, will be retained in the third grade. Parents do have the option to enroll the student in an intensive summer reading program in order to avoid retention. Beginning July 1, 2014, districts are to be assigned overall performance grades based on student academic growth, achievement gap closure, parent involvement, student attendance, employee turnover, and community involvement. The performance grade will be used to classify schools into six categories: exceptional, high performing, commendable, acceptable, needs improvement, and priority. The information will be posted on the Iowa

Department of Education website. Even though Iowa was one of the final states to formally adopt state standards, representing the state's fierce protection of local control, the swell of education reform on a national level has impacted decision makers and hence education policy.

A great deal of the modern conversation and context reverts back initially to former Presidents H. W. Bush and Bill Clinton's ushering in of the Goals 2000: Educate America Act (PL 103-227, 1994), which established an initial framework for states and national organizations to develop rigorous academic standards, design measures, and connect state and local efforts to support students in the meeting of the standards. This act spearheaded the modern standards-based reform movement and continues to drive conversations on educational best practice.

In concert with Goals 2000, Title I, the Improving America's Schools Act (IASA), was reauthorized in 1994 and aligned with the objectives of Goals 2000 requiring the development of rigorous standards, measures of academic progress toward the standards, and a means of gauging student outcomes (PL 103-382, 1994).

As the 1990s came to an end, the next iteration of the standards-based reform movement gained life with the signing of No Child Left Behind (PL 107-110, 2001) and the Congressional reauthorization of the Elementary and Secondary Education Act. Former President G. W. Bush signed the bill into law during a signing ceremony at Hamilton High School in Hamilton, Ohio, on January 8, 2002.

Essentially, NCLB ushered in the modern era of school accountability, and districts across the nation became familiar with a new term: Adequate Yearly Progress (AYP). On July 24, 2002, Secretary of Education Rod Paige issued a lengthy letter describing how states should begin to design plans for meeting AYP requirements. While each state had the leeway to design its own accountability plan to meet the new requirements, the letter stressed ten criteria as guideposts. The most impactful point of the guidance noted that each school must " . . . ensure that it assessed at least 95% of students in each subgroup enrolled" in order to meet AYP (United States Department of Education, 2002, p. 2). Under NCLB, however, states decided their own *N* size for subgroup accountability in accordance with the federal cutoff, *N* 30. For example, Iowa established *N* 10. Additionally, districts often had students that fell into more than one subgroup such as a student of minority status who also received free or reduced lunch.

Under NCLB, schools were required to annually assess students in Grades 3-8 and one time during high school. The assessments were to be aligned to the state's standards with the outcome that all students reach "proficiency" in English/Language Arts and Mathematics by the year 2014. Each state devised an accountability framework geared toward moving all students, particularly numerically significant subgroups, to "proficiency," defined as Adequate Yearly Progress. Numerically significant subgroups were categorized by race or ethnicity, poverty, language status, and disability status. Schools that failed to meet AYP in one or all categories were classified as "in need of improvement" and subject to corrective action that could potentially lead to restructuring. Parents with students enrolled in the schools identified as "in need of improvement" had to be notified and given options for sending their child or children to other schools at the cost of the local district. As a result of the increase in testing requirements across states, NCLB gave rise to a significant obstacle in the use of criterion-referenced tests that dominated the landscape of schools from the 1950s through the 1980s: lack of funding.

NCLB's requirement that all students in Grades 3-8 and one time in high school be tested in both English/Language Arts and Mathematics significantly increased the number of students being tested. School districts, in an effort to meet the new testing demands, chose to employ multiple-choice tests as a means of expediency and cost efficiency.

R. A. Skinner, writing for *Education Week*'*s* "Quality Counts" report for 2005, stated, "For the 2004-05 school year, 46 states have standards-based tests in place in reading and math at the elementary, middle, and high school levels. Twenty-two states have standards-based science tests in all three grade spans. Only 12 states, down from 14 last year, have standards-based social studies tests in all three spans" (p. 87). Based on Skinner's analysis of all states' testing systems, standards-based tests equated to multiple-choice tests, meaning tests measured students' learning of state standards utilizing multiple-choice exams. Skinner (2005) indicated that all 46 states utilized extended-response questions in English/Language Arts, while approximately two-thirds utilized short-answer questions, and only one state, Kentucky, used portfolios as part of its accountability system.

Following the development and adoption of state standards, states worked to align state assessments to the standards. However, given the potential consequences of failing to meet AYP, researchers began to voice deep concern about the states' ability to define appropriate levels of alignment and the scope with which standardized tests could measure student learning. Rothman, Slattery, and Vranek (2002) questioned "the feasibility of performance techniques and standards-referenced measurements" (p. 2). Additionally, researchers began to question whether or not the extra expense involved in completing such complex work was worthwhile. According to proponents of NCLB, the very nature of the law was to focus states' attention on typically underserved populations and a direct means of addressing the growing achievement gap across the country. On the contrary, advocates for those of minority status expressed fear that a reliance on test-based credentials would by default *de-credential* students considered poor or minority who are unable to meet the new criteria (Rothman, Slattery, & Vranek, 2002).

In spite of serious concerns, NCLB perpetuated essentialist ideologies with the premise that explicit standards for student performance and measurement of student progress toward the standards, combined with sanctions and incentives, lead to improved student learning. Critics continued to point out the danger of narrowing the curriculum students receive to that which is on the test. This posed another challenge for states and districts regarding curriculum alignment: How do we gauge the intended, enacted, assessed, and learned curricula? Education researchers also chimed in on this concern by questioning how much student learning could be derived from standards-based tests. For example, the content of the enacted curriculum is a powerful predictor of variance in student achievement gains and helps explain a portion of the achievement gap between Caucasian, African American, and Hispanic students (Porter, 2003).

In the *Effects of Testing on Instruction*, Joan Herman (2004) created Figure 1 to illustrate the best-case scenario for an aligned, standards-based approach to education.

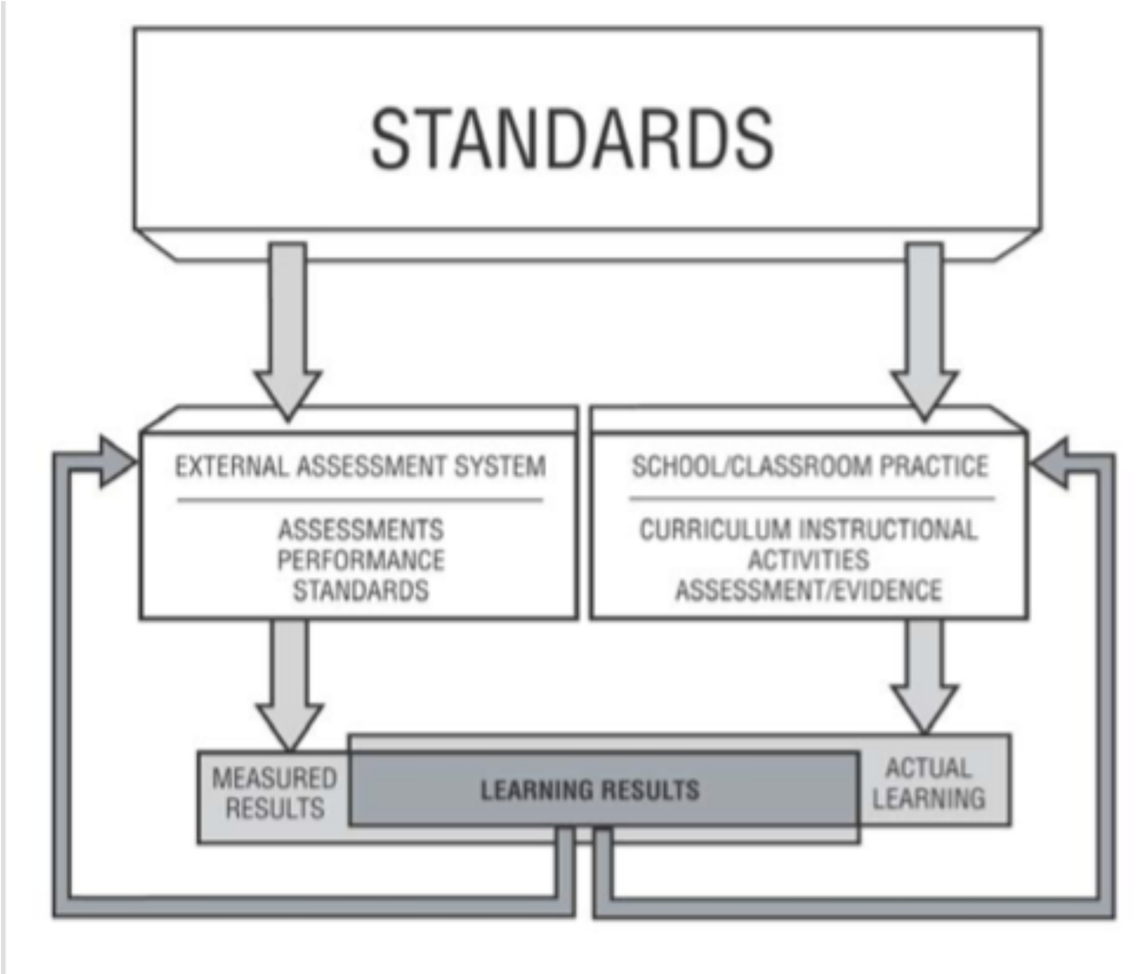

Figure 1. Effects of testing on instruction.

In an analysis of the figure, Haertel and Herman (2005) conclude the following:

> Yet even with tight alignment, Figure 1 tries to make it clear that all tests are fallible and can only measure a part of what students are learning. Tests can only assess that which can be measured in the finite time allotted for testing and through the particular formats employed in the tests—meaning that it is impossible for tests to assess everything that is important. Furthermore, all measures also contain errors and thus provide only an imperfect *estimate* of student performance. With the advent of standards-based tests, these imperfect

estimates must then be converted into proficiency classifications, based on one of a number of standard-setting methods that have been developed over the last four decades, a process that brings significant technical challenges (Haertel & Lorié, 2004, pp. 22-23).

As Barak Obama ascended to the presidency on January 20, 2009, the Elementary and Secondary Education Act (NCLB) was long overdue for reauthorization. Soon after, on July 24, 2009, President Obama and Secretary of Education Arne Duncan announced Race to the Top Program (RTTP) as part of the American Recovery and Reinvestment Act of 2009 (ARRA) (PL 111-5; 2009). The Education Recovery Act, a component of ARRA, included $4.35 billion in funds for the Race to the Top Program. The program placed focus on the following areas: great teachers and leaders, state success factors, standards and assessment, general selection criteria, improvement of the lowest achieving schools, data systems to support instruction and incentives to prioritize science, technology, engineering, and math (STEM) education.

Nearly a month prior, on June 1, 2009, the National Governor's Association (NGA) and Council of Chief State School Officers (CCSSO) released the Common Core State Standards (CCSS). The NGA describes the Common Core State Standards Initiative as a "state-led effort" by governors and state commissioners of education from 48 states, two territories, and the District of Columbia in an effort "to define the knowledge and skills that students should have to succeed in entry-level, credit-bearing, academic courses and in workforce training programs" (National Governor's Association, 2013, p. 1). Through a coordinated effort with RTTP, a substantial emphasis was placed on states' adoption of the CCSS. In reaction, critics again warned of a continued focus on essentialism within America's public schools.

The Race to the Top Program (RTTP) also commissioned a Comprehensive Assessment System Competition, resulting in the development of two consortiums: The Common Assessment Consortium led by Achieve, Inc., and the Florida-led Common Assessment Consortium. The competition allotted $350 million for the development and design of the next generation multi-state assessments aligned with the Common Core State Standards. In the fall of 2010, two proposals were granted that established The Partnership for Readiness for College and Careers (PARCC) and Smarter Balance Assessment Consortium (SBAC) (Center for K-12 Assessment and Performance Management, 2010). The new assessments are scheduled to be in use during the 2014-15 school year.

Alongside the development of new state assessments aligned to the CCSS, approximately 30 states (even those not awarded financial grants through RTTP) now require teacher and principal evaluations to include a percentage of student achievement and many states now require annual evaluations. According to the National Council on Teacher Quality's *State of the States 2012: Teacher Effectiveness Policies*, "In 11 states, student achievement/growth is the preponderant factor in teacher evaluations; in nine other states, measures of student achievement are required to significantly inform teacher evaluations" (p. 2). Since 2009 and the inception of Race to the Top, states continue to enact legislation tying personnel decisions to evaluation frameworks that rely on statistical metrics such as value added measures (VAM) and student growth percentiles

(SGP). A handful of states have enacted legislation tying these performance metrics as a provision for licensure.

Over the course of the past four years, education policy has delved even deeper into essentialism theory with a heightened focus on measurement-driven instruction resulting in system-wide divisions, political battles, distortion of the curriculum, and the worst possible outcome, cheating as exampled by Atlanta Public Schools and District of Columbia Public Schools. The Common Core Era reinforces the essentialist idea that curriculum should be standardized and students taught in a manner that ensures a basic level of skill, leaving little room for the progressive side of the educational continuum.

Long before the modern era of accountability ushered in the increased focus on high-stakes testing, in 1967 Dr. Ronald Crowell, Western Michigan University professor of Teaching and Learning, penned a response warning of the dangers inherent in such a process for two specific reasons: (1) the standard error of measurement (SEM), and (2) the Standard error of Difference (SEDIFF). Dr. Crowell expressed the following:

> In this brief discussion of these two concepts, the Standard Error of Measurement and the percent of incorrect assignments, it should be apparent that if we are making judgments regarding the capabilities of individual students based on the scores from any one standardized test, we are in danger of doing the student a great disservice by placing him in an incorrect group, making inaccurate judgments regarding his ability or by prejudicing our own view of that student's capability. This, however, is not to say that tests are not useful to us in the classroom. It does say that if we make judgments on the basis of scores of a single test the possibility exists (with a rather high probability) that we will be

making incorrect decisions. (pp. 4-5)

Rather than heeding the advice of scholars like Dr. Crowell and modern counterpart Dr. Daniel Koretz, author of *Measuring Up: What Educational Testing Really Tells Us*, President Barack Obama, with Secretary of Education Arne Duncan, introduced the Education Recovery Act embedded within the American Recovery and Reinvestment Act of 2009. The RTTP and ARRA have furthered the emphasis of creating an education system based on high-stakes standardized test scores. Dr. Koretz (2008) emphatically suggests "uses of tests and test scores rest on a single principle: Don't treat 'her score on the test' as a synonym for 'what she has learned.' A test score is just one indicator of what a student has learned—an exceptionally useful one in many ways, but nonetheless one that is unavoidably incomplete and somewhat error-prone" (p. 4).

Since Secretary Duncan initiated the ESEA waiver process for states, only seven states remain tied to NCLB requirements: California, Texas, Wyoming, Nebraska, Montana, Illinois, and Iowa. As a means of meeting the requirements of No Child Left Behind and Adequate Yearly Progress and in accordance with Chapter 12 of Iowa Code, Iowa students take the Iowa Test of Basic Skills (ITBS), a norm-referenced assessment, in Grades 3 through 8, and the Iowa Test of Educational Development (ITED), a norm referenced assessment, once in high school. To align with the Iowa Core and Common Core State Standards in 2011-2012, the tests were renamed the Iowa Assessments. Iowa utilizes norm-referenced assessments for state accountability purposes. Such assessments seek to measure students' achievement in broad areas of knowledge. Norm-referenced assessments examine each student in comparison with other students taking the same assessment. Many states employ the use of criterion-based assessments for the same purpose. However, criterion-referenced assessments seek to determine whether or not a student has achieved a specific skill or concept. The score reflects the individual's attainment of preset standards and cannot be compared with other students that take the same assessment (Huitt, 1996). Iowa districts, like several districts across the nation, either meet or do not meet Adequate Yearly Progress (AYP) according to student results on the Iowa Assessments. As of 2012-2013, twenty-eight districts qualify for the needs assistance category for AYP, and 465 schools across Iowa qualify for the needs assistance category for AYP (Iowa Department of Education, 2012).

Statement of the Problem

Maylone (2002), Jones (2008), and Turnamian and Tienken (2013) provide empirical evidence that education policy based on standardized tests as the primary measure discounts the powerful impact of demographic characteristics on a school community. Yet, policymakers continue to reinforce and introduce legislation with serious consequences for school personnel and the children they serve. Variables such as family wealth indicators that are beyond the school's control significantly influence student achievement. Researchers have documented the impact of demographic characteristics on standardized test results for over 50 years (e.g., Coleman, Hobson, Mcpartland, Mood, Weinfield, & York, 1966; Sirin, 2005; Ladd, 2011).

Currently, Iowa has a pending NCLB waiver with the United States Department of Education (USDOE) that would require Iowa schools to implement accountability measures tied to standardized test scores. In order for Iowa policymakers to make informed decisions concerning the future of education in Iowa, evidence is sorely needed that documents the potential catastrophe of building the system upon flawed judgment. Iowa's policymakers, educators, and citizens need empirically grounded evidence connecting the influence of out-of-school variables such as median home income and other socioeconomic variables on the Iowa Test of Basic Skills and the Iowa Test of Educational Development and the predictive strength of such variables. By providing such data the state will be more adequately equipped to guide education policy based on a funds of knowledge viewpoint (what the child brings into the classroom) as opposed to the deficit model (what the child lacks with no consideration of outside factors).

Purpose of the Research

The purpose of this study was to identify the specific district socioeconomic factors and school community demographic factors that accounted for the greatest amount of variance in an Iowa school district's percentage of students scoring proficient or above as defined by the Iowa Test of Basic Skills 3 and Iowa Test of Educational Development 11 in Language Arts and Mathematics. Iowa Testing Programs (2013) defined proficiency levels for the 2010 ITBS and ITED as follows: 1 to 40 as not proficient, 41 to 89 as proficient, and 90 and above as proficient but advanced. "In 2003 the state of Iowa selected the national percentile rank (NPR) metric to report cut scores . . . NPRs were based on a national sample of students that completed Forms A and B of the Iowa Assessments in the year 2000" (Iowa testing programs, 17). The study intentionally limited its focus to district socioeconomic factors on ITBS 3 and ITED 11 data from 2010.

The study sought to add credence to similar studies conducted by Maylone

(2002), Jones (2008), and Turnamian (2012). In particular, this study sought to extend the work of Turnamian (2012) by replicating a similar analysis of the data using the 2010 Iowa Test of Basic Skills for third grade, Iowa Test of Educational Development for eleventh grade, and 2010 Iowa census data. Turnamian (2012) focused on identifying specific school demographic factors that accounted for the greatest amount of variance in a New Jersey school district's percentage of students scoring Proficient or above on NJ ASK 3 in Language Arts and Mathematics.

No study of this nature has been undertaken in Iowa since the inception of No Child Left Behind. As a result, a valid predictive model of district achievement data at both the elementary and high school levels could provide policymakers and educational leaders with greater insights about how to further implement intervention models and best designate funds in support of student learning. Even though literature documents socioeconomic factors influence on student achievement, Iowa policymakers continue to pursue and enact education laws contrary to this evidence.

Study Design and Methodology

At this time, it is imperative to ascertain the degree to which socioeconomic factors are associated with student achievement on the ITBS 3 in Language Arts and Mathematics for third grade students and ITED 11 in Language Arts and Mathematics for eleventh grade students. This study used archival ITBS 3 and ITED 11 school district Language Arts and Mathematics scores from 2010 and five-year estimates from U.S. Census data to determine if a predictive equation exists amongst the data. The grade levels of student achievement were Grades 3 and 11 in order to examine the predictive model's strength across a student's academic career. In 2010, Iowa had 358 school districts. The sample for this study consisted of 160 school districts representing all state-identified urban districts and suburban districts. Since Iowa has so few districts classified as urban or suburban, a stratified sampling approach was used to ensure all would be included in the sample. The remaining school districts represent a random distribution of state identified rural districts. Data about the dependent variables of the 2010 Grades 3 and 11 ITBS/ITED in Language Arts and Mathematics for Iowa school districts were readily available through the annual publication of the Iowa Condition of Education Report. Data about the remaining independent variables (employment status, income levels, family/household type, educational attainment) for each Iowa school district were gathered from the United States Census Bureau website, American FactFinder.

Research Questions

This study examined two overarching research questions:

1. How much variance in ITBS 3 and ITED 11 2010 test results in Language Arts and Mathematics is explained by school community demographic factors?
2. Which community demographic factors account for the greatest amount of variance in a school district's percentage of students passing the 2010 ITBS 3 and ITED 11?

To gain a deeper understanding about these questions, in coordination with a thorough literature review, twenty subsidiary questions were developed.

Subsidiary Research Questions

Subsidiary Research Question 1: How much variance in the 2010 3rd grade ITBS/ITED scores in Language Arts can be explained by the income level construct for Iowa school districts?

Subsidiary Research Question 2: How much variance in the 2010 11th grade ITBS/ITED scores in Language Arts can be explained by the income level construct for Iowa school districts?

Subsidiary Research Question 3: How much variance in the 2010 3rd grade ITBS/ITED scores in Mathematics can be explained by the income level construct for Iowa school districts?

Subsidiary Research Question 4: How much variance in the 2010 11th grade ITBS/ITED scores in Mathematics can be explained by the income level construct for Iowa school districts?

Subsidiary Research Question 5: How much variance in the 2010 3rd grade ITBS/ITED scores in Language Arts can be explained by the family/household type construct for Iowa school districts?

Subsidiary Research Question 6: How much variance in the 2010 11th grade ITBS/ITED scores in Language Arts can be explained by the family/household type construct for Iowa school districts?

Subsidiary Research Question 7: How much variance in the 2010 3rd grade ITBS/ITED scores in Mathematics can be explained by the income level construct for Iowa school districts?

Subsidiary Research Question 8: How much variance in the 2010 11th grade ITBS/ITED sores in Mathematics can be explained by the income level construct for Iowa school districts?

Subsidiary Research Question 9: How much variance in the 2010 3rd grade ITBS/ITED scores in Language Arts can be explained by the parental education attainment construct for Iowa school districts?

Subsidiary Research Question 10: How much variance in the 2010 11th grade ITBS/ITED scores in Language Arts can be explained by the parental education attainment construct for Iowa school districts?

Subsidiary Research Question 11: How much variance in the 2010 3rd grade ITBS/ITED scores in Mathematics can be explained by the parental education attainment construct for Iowa school districts?

Subsidiary Research Question 12: How much variance in the 2010 11th grade ITBS/ITED scores in Mathematics can be explained by the parental education attainment construct for Iowa school districts?

Subsidiary Research Question 13: Which combination of school community demographic factors shows the most variance in students 3rd grade ITBS/ITED scores in Language Arts?

Subsidiary Research Question 14: Which combination of school community demographic factors shows the most variance in students 11th grade ITBS/ITED scores in Language Arts?

Subsidiary Research Question 15: Which combination of school community demographic factors shows the most variance in students 3rd grade ITBS/ITED scores in Mathematics?

Subsidiary Research Question 16: Which combination of school community demographic factors shows the most variance in students 11th grade ITBS/ITED scores in Mathematics?

Subsidiary Research Question 17: Which combination of school community demographic factors best predicts how students performed on the 2010 3rd grade ITBS/ITED in Language Arts?

Subsidiary Research Question 18: Which combination of school community demographic factors best predicts how students performed on the 2010 11th grade ITBS/ITED in Language Arts?

Subsidiary Research Question 19: Which combination of school community demographic factors best predicts how students performed on the 2010 3rd grade ITBS/ITED in Mathematics?

Subsidiary Research Question 20: Which combination of school community demographic factors best predicts how students performed on the 2010 11th grade ITBS/ITED in Mathematics?

The unit of analysis for this study was the school district. The study replicated the independent variables of Turnamian (2012).

This study examined the following independent variables:

Household Income, defined as follows:

- Median district household income
- Percentage of families below poverty
- Percentage of economically disadvantaged
- Percentage of household annual income under $30,000

- Percentage of household annual income above $200,000

Lone-Parent Household, defined as follows:

- Percentage of district male households, no female
- Percentage of district female households, no male

Parental Education, defined as follows:

- Percentage of population 25 years or older, no high school diploma
- Percentage of population 25 years or older, high school graduate
- Percentage of population 25 years or older, high school graduates and some college experience
- Percentage of population 25 years or older, bachelor's degree
- Percentage of population 25 years or older, advanced degree

The dependent variables for this study were school district ITBS 3 and ITED 11 Language Arts and Mathematics proficiency data, which were defined as the percentage of the student population that achieved either a proficient or proficient but advanced score.

Theoretical Framework

This study was designed to supplement the research base for a new policy context to better explain which out-of-school factors are predictably impacting student achievement in Grades 3 and 11 for Iowa school districts.

In 1965, the federal government signed the Elementary and Secondary Education Act (ESEA) into law. With the establishment of Title I, schools received funding for a broad spectrum of programs designed to target impoverished students (Elementary and Secondary Education Act, 1965; Kirp, 1977). Soon after ESEA took effect, the National

Assessment of Educational Progress (NAEP) was administered to select samples of students in all states beginning in 1969. A direct discovery as a result of ESEA and NAEP was the growing achievement gap between predominantly White students and minority students. Since the 1960s, America's education policy has continued to emphasize the urgent need to narrow and/or close the achievement gap. Research, however, continues to challenge the assertions made by policymakers and educational leaders claiming the achievement gap can be abolished. Rothstein (2007) states, "Deficits like these cannot be made up by schools alone, no matter how high the teachers' expectations. For all children to achieve the same goals, the less advantaged would have to enter school with verbal fluency that is similar to the fluency of middle-class children" (p. 6).

Rothstein (2007) builds upon the work of Betty Hart and Todd Risley, researchers from the University of Kansas, who found that "on average, professional parents spoke more than 2,000 words or more per hour to their children, working-class parents spoke about 1,300, and welfare mothers spoke about 600. So by age three, the children of professional parents had vocabularies that were nearly 50% greater than those of working-class children and twice as large as those of welfare children" (Rothstein, p. 6). In spite of this research and other seminal studies such as the *Equality of Education Opportunity* (Coleman, Campbell, Hobson, McPhartland, Mood, Weinfield, & York, 1966) study, more commonly known as the Coleman Report, requested by President Lyndon B. Johnson's administration, education policy and classroom instructional practices continue to focus solely on the most controllable factor: the classroom teacher. In the modern context, much of this theory can be attributed directly to Stanford professor Erik Hanushek (2004), who states that four consecutive years of quality teaching can eliminate any trace of socioeconomic disadvantage based on his research on market factors and teacher quality. Hanushek's research perpetuates the notion that quality teaching can be quantified using statistical methods and standardized test scores, and current reforms reflect this sentiment.

Since reformers continue to develop policy on the disputed research claims of those like Professor Hanushek's, it is more important than ever to consider recent information published by the Educational Testing Service stating that "more than one in five of all U.S. children live in poverty" (Croley & Baker, 2013, p. 7). The report also indicates that the United States, out of 35 of the wealthiest countries, currently ranks second highest in childhood poverty. With a great discrepancy in what constitutes empirically sound data, further research is warranted in determining which school community demographic factors impact and thus explain student achievement as measured by standardized tests.

Significance of the Study

Further empirical data is necessary to determine the predictive validity of school community demographic factors on student achievement as determined by standardized assessments. This study sought to further investigate the research of Maylone (2002), Jones (2008), Turnamian (2012), and Turnamian and Tienken (2013), utilizing Iowa student achievement scores and U.S. Census data for Iowa counties. Research performed by the authors listed above, using multiple regression analyses of district-level socio-economic data and student achievement data, illustrates a significant correlation between certain socioeconomic constructs and standardized achievement scores.

Currently, Iowa has not embraced the use of standardized test scores as a method of evaluating effective teaching. However, policymakers and education leaders continue to ponder the recommendations made by the U.S. Department of Education concerning the states pending ESEA waiver application that requires states to adopt this practice as a percentage of the evaluation process for both teachers and administrators. It is imperative that future decisions rely on empirically grounded evidence before making high-stakes decisions. This research sought to offer decision makers data to examine the intentions behind Senate File 2284 requiring districts to begin retaining third grade students not proficient in reading based upon state approved early warning assessments or the yearly statewide assessments. The findings are designed to aid decision makers in determining appropriate intervention strategies before students encounter potential retention. For example, in spite of research available on the negative impact of student retention, legislators still passed the law. Professor John Hattie's meta-analysis synthesizing over 800 education studies indicates a negative effect size of -.13 for retention, meaning this practice actually harms students (Hattie, 2008).

Delimitations

Data for this study were gathered from two sources: the 2010 Iowa Test of Basic Skills 3 and Iowa Test of Educational Development 11 for Language Arts and Mathematics provided on each school district's annual School Report Card. District socioeconomic data were taken from the U.S. Census Bureau's American FactFinder. For this study the data were analyzed at the district level and not individual school level.

Analysis of district socioeconomic data was delimited to socioeconomic data in Turnamian (2012) as well as associated variables identified during the review of literature. This study focused solely on the standardized testing data, ITBS 3 and ITED 11, because of the tests' use in determining Adequate Yearly Progress for all districts in Iowa.

This study focused only on Iowa district data, and for this reason cannot be generalized for school districts in other states. The study was also delimited to district-level findings and, therefore, findings cannot be generalized to individual schools, individual students, individual teachers, or student populations beyond Grades 3 and 11.

Limitations

The results of the research apply only to data generated from the ITBS 3 and ITED 11 Language Arts and Mathematics scores and demographic data from the specific districts sampled in Iowa for 2010.

The study was not an experimental design and hence cannot determine cause. The sample size for this study was the entire population with at least 25 students enrolled in Grades 3 and 11. As a result, estimates about specific characteristics of all Iowa school districts can be made with a high degree of reliability.

Definition of Terms

Adequate Yearly Progress: The measure by which schools, districts, and states are held accountable for student performance as established by No Child Left Behind (NCLB). AYP tracks the percentage of students achieving proficiency in Grades 3-8 and once in high school in Language Arts and Mathematics.

Criterion-Referenced Assessments: Criterion-referenced assessments examine an individual student's performance on an assessment in comparison to a predetermined, external standard instead of the performance of other students (Gay, Mills, & Airasian, 2000).

High-Stakes Testing: A test can be categorized as high-stakes when its results are used to make important decisions that affect students, teachers, administrators, communities, schools, and districts (Madaus, 1988). Additionally, high-stakes tests are a part of a policy design (Schneider & Ingram, 1997) that "links the score on one set of standardized tests to grade promotion, high school graduation, and in some cases teacher and principal salaries and tenure decisions" (Orfield & Wald, 2000, p. 38).

Iowa Test of Basic Skills: The Iowa Test of Basic Skills (ITBS), also referred to as the Iowa Assessments, is a set of standardized tests developed by the University of Iowa within the Iowa Testing Program (ITP) division. The ITBS tests students in Grades 3-8 in multiple disciplines. School districts in the state of Iowa utilize the ITBS to gauge AYP in Language Arts and Mathematics.

Iowa Test of Educational Development: The Iowa Test of Educational Development (ITED), also referred to as the Iowa Assessments, is a set of standardized tests developed by the University of Iowa within the Iowa Testing Program (ITP) division. The ITED tests students in Grades 9-12 in multiple disciplines. School districts in the state of Iowa utilize the ITED to gauge AYP in Language Arts and Mathematics.

No Child Left Behind: President George W. Bush signed this legislation into law on January 8, 2002. NCLB mandates that states meet the goal of 100% proficiency for all students in Language Arts and Mathematics by the year 2014.

Norm-Referenced Assessment: Norm-referenced assessments examine a student's performance on an assessment in comparison to the performance of other students. In other words, students are compared to other like student groups either regionally or nationally (Gay, Mills, & Airasian, 2000).

Out-of-School Factors: Out-of-school factors (OSFs) serve a powerful role in defining existing achievement gaps. OSFs are comprised of a host of variables that impact a student's achievement, such as poverty-induced physical, sociological, and psychological effects (Berliner, 2009).

Predictive Validity: Predictive validity is the extent to which a score on a scale or test predicts scores on some criterion measure (Cronback & Meehl, 1955).

Standard Error of Measurement: The standard error of measurement (SEM) represents "an estimate of how often one can expect errors of a given size in an individual's test score" (Gay, Mills, & Airaisan, 2000, p. 169).

Organization

The remainder of this dissertation is organized in the following manner:

Chapter II provides a review of the literature relevant to the following topics: poverty, high-stakes testing, educational paradigms, state and federal education policy, and correlations between various school community demographic factors and student achievement on standardized tests. The review also provides an educational, economic, political, and sociological context for the study. Chapter III details the research methodology, focusing on the steps followed in generating correlational coefficients (socioeconomic constructs versus standardized test scores) and the predictive equation. Chapter IV consists of a presentation of the generated data in table and narrative form, along with analysis. Chapter V summarizes possible inferences and policy implications based on the results of this study and recommendations for further research.

CHAPTER II

SIGNIFICANCE OF THE LITERATURE

The driving purpose of this study was to examine the strength and direction of the relationships between district demographic data and the data's impact on student achievement. The following literature review examines research and articles in order to identify empirical evidence that attempts to establish the statistical significance, if any, between student demographic data and standardized tests. In addition, the literature review seeks to establish the historical context leading to America's significant shift toward accountability measures and the impact on philosophies of education and education policy. The review of literature is comprised of the proceeding sections: Historical Context, High-Stakes Testing, Socioeconomic Status and Student Achievement, Education Policy, State-Level Testing, Early Childhood Learning, and Intervention.

Literature Search Procedures

I used various research tools and sources in order to explore literature related to the identified sections within this chapter. In particular, I used the Seton Hall library website, Google Scholar, and sites like Journal Storage (JSTOR), ProQuest, electronic journals, and ERIC. I reviewed articles and publications from the Iowa Department of

Education, the United States Department of Education, and peer-reviewed journals in order to determine current education policies. I also used the dissertations of Nelson Maylone (2002), Megan Jones (2008), Peter Turnamian (2012), as well as other articles and publications from educational experts as a foundation for supporting this study. The framework for effectively organizing a literature review outlined in Boote and Beile (2005) served as a guide to this study.

Inclusion and Exclusion Criteria for the Literature Review

Studies that met the following criteria were included in this review:

1. Peer-reviewed dissertations, journal articles, or government reports.
2. Reported statistical significance of findings.
3. Published within the last 30 years unless a seminal piece relevant to review of a specific time period.
4. Used an experimental, quasi-experimental, non-experimental with control groups, or quantitative empirical study design.

The review sought to detail the historical development of two distinct philosophies that have shaped education policy over the past 100 years: essentialism and progressivism. Particular attention was paid to the primary developers of both philosophies and in turn their influence on later theorists. These theorists include William Bagley, John Dewey, Edward Thorndike, Francis Taylor, and Francis W. Parker. Amrein and Berliner (2002a and 2002b) provide the context for examining the debate about the influence of high-stakes testing policy on student achievement using analyses of both NAEP and state assessments.

Historical Context

By the end of the 19th century, all states had established free elementary schools, at least within urban centers. Over 100 years later, America continues to open schools and provide unparalleled access to a free and appropriate education for all youth. However, the great debate over what constitutes an appropriate education continues into the modern century. Two movements in particular identify the great divide between instructional paradigms: the essentialist paradigm and the progressive paradigm.

In the early development of the country, Thomas Jefferson articulated four clear purposes for educating youth: (1) Education is a means and must be used wisely, (2) Education is a highly legitimate claimant on public treasuries, (3) Education is a necessary handmaiden to effective citizenship, and (4) Education, as a lifelong encounter with the delights of the human mind, is an end in itself (Apple, 2004). Education literature associates Jefferson's ideals with the tenets of progressivism. University of Massachusetts at Lowell Professor Jim Nehring (2006) argues that what many classify as innovative schools in the current century merely represent a lasting legacy of traditional schools founded on principles of progressivism. Professor Nehring defines progressivism as "a curriculum driven by questions, respect for the mind and imagination of the student, a focus on the intellectual skills and habits, and the driving conviction that students are not merely empty vessels into which knowledge is poured . . . " (p. 32).

Much of the Progressive Education Movement began with Francis Parker's work as superintendent of Quincy schools in Quincy, Massachusetts, in 1875. Upon entering into this work, Parker developed the Quincy Plan, which abandoned prescribed curricula and rote skill methods based on memorization and instead focused on meaningful learning that led to an active understanding of concepts by students. Parker faced a great deal of criticism for the Quincy Plan and in 1879 had to give students the state examinations in traditional subjects. The test results revealed that Quincy students outperformed many of their peers across Massachusetts, further legitimizing Parker's belief in attending to the whole child. Parker, however, dismissed much of the test results and continued to advocate that education should not focus solely on a set of narrow academic results but rather on the school's ability to create a humanized and respectful learning environment. Parker stated, "If you ask me to name the best of all in results, I should say, the more human treatment of little folks" (Rippa, 1997, p. 162). In 1901, Francis Parker founded the Francis W. Parker School in Chicago and another opened in San Diego in 1912. Both remain in operation today.

While working in Chicago, Parker became connected with the Chicago Laboratory School, a school founded by John Dewey, who refers to Parker as the "father" of the Progressive Education Movement. In his work *Experience and Education* (1938), Dewey argues that the quality of a student's quality of an educational experience relies on the importance of social interactions supported by interactive lessons. John Dewey's writings support his educational philosophy that students must interact with the curriculum and students need ownership over their learning. Dewey also consistently emphasizes education's role in developing the ideas of democracy and social reform. In *Democracy and Education* (1916), Dewey states, "The sole direct path to enduring improvement in the methods of instruction and learning consists in centering upon the conditions which exact, promote, and test thinking . . . the important thing to bear in mind is that thinking is the method, the method of intelligent experience in the course which it takes."

In 1918, the Commission on the Reorganization of Secondary Education released *The Cardinal Principles of Secondary Education*. The Commission stated, "Education in a democracy, both within and without schools, should develop in each individual the knowledge, interests, ideals, habits, and powers whereby he will find his place and use that place to shape both himself and society toward nobler ends" (National Education Association of the United States, 1918, p. 3). As a result of this report, the country witnessed an expansion of the public school system in an effort to afford all youth an opportunity to attain meaningful education. Also by 1918 all states had enacted compulsory attendance laws. In 1890, approximately 6% of age eligible students attended high school, of which only 10-20% graduated. By 1900, 78.7% of youth between ages five and seventeen attended high school, and by 1926 the percentage of youth attending high school reached 90.4% (Ballantyne, 2002).

As the American education system expanded, an influential study conducted by Tyler et al. emerged in the 1930s: the Eight-Year Study. The study that ran from 1932 to 1939 produced empirical evidence supporting the Progressive Education Movement. In this study the authors collaborated with 30 secondary schools throughout the United States. The 30 high schools were chosen to "demonstrate fully the effects of a variety of programs of instruction planned and initiated to emphasize many different avenues of study and experiences which could result in satisfactory achievement at the college level" (Ritchie, 1971). The study's primary purpose was to test the college admission requirements that held closely to the theory that one particular course of study was superior to other course options in order to prepare students for post-secondary success.

The study examined 1475 pairs of students attending college between 1936 and

1939. As teachers and principals engaged in the work, many expressed how profoundly difficult the task would be. As the staffs began to re-examine their curriculums and purpose for educating students, each school committed to focusing on the worth and integrity of each individual: “The individual possesses importance as an entity, is unique and not capable of duplication. This optimal development is to be encouraged and fostered, not only because it is the inherent right of the individual, but also because individual maximum development contributes to the common good” (Ritchie, 1971, p. 485). Each school was given autonomy over curricular choices and school design. As a result, the schools had to abandon the typically standardized approach to learning and work collaboratively within and across subject matters and base decisions on the needs of the students.

According to Ritchie (1971), teachers found seven valid reasons that the child-centered approach was more suitable than traditional approaches: (1) cut across subject-matter lines, (2) frequently called for cooperative planning and teaching, (3) called for exploration of a wide range of relationships, (4) provided for experiences valid for large groups, (5) dealt with subject matter that did not require extended drill in specific skills (such as the operations), (6) used larger blocks of time than a single period, and (7) used a wide range of source material and techniques for gathering information and classroom activities (p. 485).

Unfortunately, the research project halted with the outbreak of World War II, but in 1940 the Progressive Education Association released the findings. Within the finding’s conclusions, William Aiken (1942), director of the study, reported the following:

The graduates of the most experimental schools were strikingly more successful

> than their matches. Differences in their favor were much greater than the differences between the total Thirty Schools and their comparison group. Conversely, there were no large or consistent differences between the least experimental graduates and their comparison group. For these students the differences were smaller and less consistent than for the total Thirty Schools and their comparison group. If the proof of the pudding lies in these groups, and a good part of it does, then it follows that the colleges got from these most experimental schools a higher proportion of sound, effective college material than they did from the more conventional schools in similar environments. If colleges want students of sound scholarship with vital interests, students who have developed effective and objective habits of thinking, and who yet maintain a healthy orientation toward their fellows, then they will encourage the already obvious trend away from restrictions which tend to inhibit departures or deviations from the conventional curriculum patterns. (p. 113)

As World War II pressed onward, American culture shifted away from progressive ideals and much of the empirical evidence provided by the Eight-Year Study went dormant. As America entered the Cold War Era, all work associated with previously protected democratic ideals became suspect as communist paranoia spread.

As Dewey, Parker, and Tyler worked to stress the importance of education as a democratic process, theorists Bagley, Bestor, and Adler worked to stress an essentialist view of educational theory. The Committee of Ten led the charge of laying the foundation for essentialist theories by establishing a report that became influential on secondary curriculums after its publication in 1893 (Tanner, 2007). After the report was released, secondary schools began to develop curriculum sequences that focused on English, math, civics, and science. The committee emphasized that every subject taught at the secondary level should be taught in a similar manner and at a similar pace in order to provide all students equal exposure to a guaranteed and viable curriculum. The Committee's report also impacted teacher preparation programs and a call for more highly qualified teachers in classrooms. Following in the footsteps of the Committee of Ten, William Bagley (1934) emerged as the leading theorist behind the teaching of traditional subjects thoroughly and rigorously.

Bagley developed his educational theories in *The Educative Process* (1907), *Education and Utility* (1909), and *Educational Values* (1911). Throughout these works he sought to marry the study of psychology with educational theory. Bagley founded The Essentialist Committee for the Advancement of American Education (1938) in an effort to counteract his counterparts in the Progressive Education Movement. In *Education and Emergent Man* (1934), Bagley directly refutes progressive education ideals, stating that progressivism "damaged the intellect and moral standards of the students." Bagley seemed to be primarily driven by his concern for the expansion of universal schooling and the sheer volume of students educated in the United States. He claimed that as a result of the increase in volume, the quality of education in the United States was declining and that distinct standards and curriculum must be defined and delivered uniformly if students were expected to succeed and compete with their European counterparts.

As a continuation of Bagley's work, theorist Arthur Bestor (1953) expanded on his predecessor's work in *Educational Wastelands* by defining the school's primary mission as the development of intellectual disciplines. In this work, Bestor claims that progressive educators had "lowered the aims of the American public schools," particularly by "setting forth purposes for education so trivial as to forfeit the respectful thought of men, and by deliberately divorcing the schools from the disciplines of science and scholarship" (Bestor, 1953, p. 8). He continued the argument by claiming progressive educators furthered the decline of the education system and "by misrepresenting and undervaluing liberal education, have contributed . . . to the growth of anti-intellectualist hysteria that threatens not merely schools but freedom itself" (Bestor, 1953, p. 11).

As a follow up to *Educational Wastelands*, Bestor published *The Restoration of Learning* (1956) detailing the five functions of the secondary school: (1) intellectual training in the fundamental disciplines, which should be geared to the serious student and targeted at the upper two-thirds of ability; (2) special opportunities for academically superior students; (3) balancing programs for the top third of students with programs for the bottom third; (4) physical education; and (5) vocational training. Bestor's writing emphasized the notion that public education served the academically talented at the expense of nonacademic students. He discounted extracurricular activities and espoused theories toward the further education of top students and retention of the least able students.

In spite of the work promulgated by Bagley (1934) and Bestor (1953), the Essentialist Movement did not gain much attention during the 1960s and 1970s. However, as the 1980s began to unfold, three national reports on education emerged: *A Nation At Risk* (National Commission on Excellence in Education, 1983), *Educating Americans for the 21st Century* (Coleman, Selby, Cecily, Cannon, et al., 1983), and

Action for Excellence (Task force on Education for Economic Growth, 1983). As a result of the three major reports, Mortimer Adler's *Paideia Proposal: An Educational Manifesto,* introduced in 1982, gained the attention of education reformers and essentially reinforced Bestor's recommendations for secondary school reform. Adler also maintained a focus on five tenets: (1) Language Arts, (2) mathematics, (3) history, (4) physical education, and (5) school-to-work skills. The proposal limited any elective classes to foreign language and laid out a single-track essentialist curriculum for primary and secondary grades. Adler's recommendations for instruction provided "three distinct modes of teaching and learning" (Tanner & Tanner, 2007, p. 308): (1) lecture and recitation, (2) coaching and drilling exercises, and (3) Socratic questioning and response.

Of the three national reports, the nation focused on the NCEE's *A Nation at Risk* in conjunction with the economic connection from *Action for Excellence* largely pushing Coleman's work on poverty to the background. As a result, Adler's proposal received heightened attention and began to permeate education policy. In fact, the lead author of *A Nation at Risk*, Theodore Sizer, served as a member of Paideia Group working alongside Adler. Sizer capitalized on the nation's interest in essentialist education policy by authoring *Horace's Compromise* in 1984. A predominant theme throughout the book is "less is more" when it comes to education. In order to further reinforce "less is more," Sizer followed up *Horace's Compromise* with *The Shopping Mall High School* a year later in 1985. Sizer continued to advocate for a simplified curriculum over the "shopping mall" arrangement of most secondary schools.

Tanner and Tanner (2007) capture an important distinction between essentialist and progressive theories in the following statement:

> In 1907, the essentialist William C. Bagley wrote that curriculum and the work of the teacher "must represent a storehouse of organized race experience, conserved against the time when knowledge shall be needed in the constructive solution of new and untried problems." Although, as discussed later, many progressives also recognize the importance of the codified experience of the human race, their conception of such experience extends far beyond that of organized bodies of academic knowledge. Moreover, where the essentialist tends to see such knowledge largely as something to be acquired and stored for some future use, the progressivist is concerned with the significance of such knowledge in the life of the learner (p. 101).

Students in the United States, from the 1950s until the modern day, have been exposed predominantly to essentialist theories, or what some prefer to call the "back-to-the-basics" movement. Ever since Russia launched *Sputnik* in 1957, the United States has witnessed a focus on narrowing the curriculum taught in public schools. In 1991, President George H. W. Bush announced the America 2000/Goals 2000 program, setting forth competency requirements in English, mathematics, science, history, and geography. Soon after, President Bill Clinton endorsed the educational program in support of the states' development of world-class standards matched to statewide achievement tests as the means of measuring progress toward meeting the standards.

As an extension of the *America 2000* program, President George W. Bush and Congress introduced the No Child Left Behind Act in 2001, further solidifying the United States' focus on reading and math as the core measurements of a school's and district's success. As a result of NCLB's requirement that schools meet Adequate Yearly Progress for all students in reading and math, schools felt significant pressure to focus more time in these areas, particularly for disadvantaged students.

Theorists continue to spar over essentialist and progressive approaches toward curriculum development. Essentialists "[continue] to see the curriculum as a distillation of the cumulative tradition of organized knowledge" (Tanner & Tanner, 2007, p. 122). Accountability keeps curriculum focused on efficiency, which largely defines the current environment of most U.S. schools. Education policy at the federal and state level has placed high-stakes measures with student results on statewide standardized tests. Conversely, progressivists "[seek] a more comprehensive and functional conception of curriculum as a planned learning environment or as the guided experiences provided under the auspices of the school" (Tanner & Tanner, 2007, p. 122). Given the current high-stakes environment, progressivists seek to return the focus on curriculum toward wider learning experiences for students that cannot be honed down into a standardized test score.

Assessment and High-Stakes Testing

Madaus, Higgins, and Russell (2009) state that standardized tests gained importance in the 1970s with the introduction of minimum competency testing. The authors explain that the 1980s increased the use of standardized tests through standards-based testing, ultimately giving way to the modernly termed "high-stakes" testing in the 1990s onward. Researchers and theorists use similar language to define "high-stakes" testing which has been noted elsewhere in this document. The initial principles behind standardized tests were well intentioned. The movement sought to focus instruction and learning on important content and skills denoted in state curriculums. In each state, the goal of testing was to define standards and expectations for student learning. The tests also sought to provide communities with information about the quality of local schools and, in effect, aid parents in making decisions about which schools their children should attend (Madaus, Higgins, & Russell, 2009, p. 2).

The majority of definitions agree that a test is high-stakes when its results are used to make important decisions that affect students, teachers, administrators, communities, schools, and districts (Madaus, 1988). Popham (1998) explained that state and federal governments have enacted accountability laws tied to student standardized test scores as a method of making schools show whether or not their students are making academic progress. As a generalization, teachers and administrators view the standardized tests as “high-stakes” because they are reported publicly. Beck (1995) confirmed this generalization in Utah by studying teacher and administrator perceptions of publicly posted test results.

However, recent history suggests that a growing negative reaction toward “high-stakes” testing exists. For instance, Superintendent Starr of Montgomery County Schools, Maryland, insisted the country needs a three-year moratorium on standardized testing in order to “stop the insanity” of evaluating teachers and administrators according to student test scores (The School Superintendents Association, 2012). Hardy (2000) further supports the growing resentment and suggests the issue has the potential to polarize both communities and school boards of education and notes that there are numerous protests, including lawsuits, against such tests and practices. However, he also suggests this represents a fairly new phenomenon.

Proponents of standardized testing often refer to an article published in the *American School Board Journal* (1997) in which authors Smith and Jorgensen (1997) argue that educators are often misguided in attacking standardized assessments. The authors claim that high-stakes testing reflects a significant aspect of "real world" preparedness and that schools are obliged to teach students necessary skills to do well on such assessments. Smith and Jorgenson criticize educators that dismiss standardized tests as futile and correlate such dismissal with the under-preparation of students that show up in student results. They also emphasize that students exposed to educators' general sense of malaise toward standardized tests often lead to poorer student performance.

Literature on the public's perception of "high-stakes" tests reveals a general level of acceptance. For most people, testing is a normal part of the educational process, therefore leading to more acceptance than resistance. Shepard (2000) cited Skinner (1954) in order to provide a theoretical explanation for the general public support of "high-stakes" testing: "The whole process of becoming competent in any field must be divided up into a very large number of small steps, and reinforcement must be contingent on the accomplishment of each step" (p. 5). Shepard builds upon the notion of efficiency in practice as established by the theories of Taylor, Thorndike, and Hawthorne. She states that in spite of multiple reform efforts across decades, the general perception toward assessment has remained confined to standardized tests that are linked to the scientific management theory of learning. As a result, the educational paradigm has been resistant to change and largely rejected the idea of incorporating more holistic approaches of gauging student learning.

Even though the Constitution of the United States does not mention education, over the past century governmental influence on local districts in terms of high-stakes testing has grown exponentially. Edward Thorndike played a large part in initiating this movement with his participation in The Committee on Classification of Personnel from 1917 to 1919 that sought to measure intelligence levels of Army recruits. As a result of this measurement, school children were soon administered similar intelligence tests on a national scale. An interest in this approach only heightened with the passage of the National Defense Education Act (NDEA) in response to Russia's launch of *Sputnik* (Federal Government, 1958). The NDEA represented an important shift in the federal government's interest in student achievement. In coordination with the passing of the NDEA, The National Science Foundation (NSF) released what is widely considered to be the first national curriculum by developing both mathematics and science standards in the 1950s (Schoenfeld, 2004, p. 257).

Such interest was fortified by the passing of the Elementary and Secondary Education Act (ESEA) in 1965. The legislation increased the financial burden on local schools districts and focused mostly on schools with low-income families. The law stated the following:

> . . . the Congress hereby declared it to be the policy of the United States to provide financial assistance . . . to local educational agencies serving areas with concentrations of children from low-income families to expand and improve their educational programs (Public Law 89-10, Section 201, Elementary and Secondary Act, 1965).

The legislation provided federal money for education through Title I programs aimed at moving students out of poverty and ending the economic achievement gap (Elementary and Secondary Education Act, 1965; Kirp, 1977). In conjunction with Title I, the legislation required yearly assessments of students that could be used to evaluate school performance and ultimately lead to the introduction of the National Assessment of Educational Progress (NAEP) test. The NAEP assessments, commonly referred to as the Nation's Report Card and administered by the National Center for Education Statistics (NCES), represent a random sample of nine, thirteen, and nineteen year-olds with tests across various subject areas. Although the NAEP assessments do not serve as an accountability tool for local districts, the results have become an increasingly popular platform for states to criticize the inadequacy of student achievement. The Iowa Department of Education (2013) released the following statement with the NCES release of the 2013 NAEP results: "Iowa's student results on the National Assessment of Educational Progress show some gains in math and reading since 2011, but stagnation over the long term remains a challenge statewide" (p. 41).

According to Cuban (1993), "While a good school prior to 1965 provided students and teachers with the materials associated with education, The Elementary and Secondary Education Act (ESEA) shifted accountability towards a student-centered model. The government declared that high-quality schools produced favorable outcomes" (p. 1). Additionally, Jones (2008) found initial standards-based assessments in the 1970s followed the "back-to-basics" philosophy focusing on minimum competencies. During the early stages of the "back-to-basics" movement, schools did not have to worry about high-stakes outcomes. However, since the 1980s, federal and state education policy continues to ratchet up the role of test results. Current education policy relies solely on standardized test scores as a primary measure of success. Test scores impact local autonomy in terms of funding, staffing, and public perception. In the case of poor test scores, schools across the country now find pressures with school choice options that allow students to enroll in charters or private institutions if their home school is underperforming in accordance with federal accountability measures.

Currently, President Obama and Secretary of Education Arne Duncan continue to push the role of standardized tests as the primary component of education reform. The initial leap arrived with the introduction of The Race to the Top Program (RTTP) in 2010, a grant application process supported by the American Recovery and Reinvestment Act of 2009. Nearly every state applied for a portion of the grant funds totaling $4.35 billion dollars. In order to score highly on the application, each state had to articulate a plan for complying with the Common Core State Standards (CCSS), allowing school choice options primarily through charters, turning around persistently low performing schools, and attaching performance-based metrics to teacher and administrator evaluations. More specifically, the grant process pushed states to tie teacher and administrator accountability to standardized tests scores through the use of statistical models such as Value-Added Measures (VAM) or Student Growth Percentiles (SGP). The administration emphasized a departure from NCLB's version of AYP by emphasizing student growth over time in accordance with their primary teacher(s), all based on standardized test results.

Shortly after the launch of RTTP, the administration invited states to apply for an ESEA waiver in order to address the growing concerns that schools would not meet the proficiency standards, all students proficient by 2014. The ESEA waivers build upon RTTP's foundations and mirror much of the requirements established in the grant process. As a result, current federal policy builds upon the standardized test accountability measures established by NCLB and drills the accountability down to the teacher level as opposed to the school and district level accountability established by NCLB.

The public nature of federal education policy and its impact on state and local education policy begs the question of what constitutes a free and appropriate education for students housed within local systems affected by high-stakes accountability measures. The evidence remains convoluted at best. Certain researchers purport that high-stakes assessments lead to improved student outcomes (Braun 2004; Carnoy & Loeb, 2002; Center on Education Policy, September 2010; Hanushek & Raymond, 2004). Carnoy and Loeb examined the relationship between state accountability systems and improved student achievement. Carnoy and Loeb (2002) state the following in their conclusion:

> We ran a number of tests to check the robustness of our findings. Our results indicate a positive and significant relationship between the strength of states' accountability systems and math achievement gains at the 8th grade level across racial/ethnic groups. Surprisingly, students' achievement at higher levels of math skills also is also related significantly to stronger state accountability, suggesting that focusing on high standards and how well schools do on tests may also improve higher-level skills (p. 320).

On the contrary, opposing researchers claim that high-stakes assessments are harmful to student outcomes and in turn exacerbate achievement gaps between subgroups

(Amrein & Berliner, 2002; Nagaoka & Roderick, 2005; Rustique-Forrester 2005). In a study of England's efforts to raise standards and impose high-stakes accountability measures, Rustique-Forrester offered the following advice to the United States:

> Academic rigor and college readiness—the current mantra of high school reform in the United States—will not result through the rhetoric and will of policymakers, but will come about because of the efforts of highly skilled teachers to deliver instruction and curriculum in ways that will enable each and every student to engage in a process of meaningful learning, within a caring and personalized environment. (p. 33).

State-Level Policy

Currently, Iowa Code subsection 256.7(21)(c) requires accredited school districts to annually report the progress of student achievement in their Annual Progress Report (APR). No Child Left Behind requires that all states assess all students in reading, mathematics, and science. To meet the requirements of the legislation, Iowa school districts must report assessment results for all students in reading and mathematics in Grades 3 through 8 and in Grade 11. In Iowa, all public schools are held to the requirement of making adequate yearly progress toward 100% proficiency by the 2013-2014 school year. For purposes of AYP accountability, all public schools are judged by performance and improvement on the Iowa Assessments (formerly the Iowa Test of Basic Skills (ITBS) and Iowa Test of Educational Development (ITED)) (Iowa Department of Education, 2012).

During the 2013 legislative session, legislators enacted Iowa Code §279.68 regarding early literacy progression. The Iowa Department of Education interpreted Iowa

Code §279.68 in Iowa Administrative Code 281-62. This legislative enactment codified the following requirements of school districts:

- Assess all K-3 students at the beginning of the school year and intermittently throughout the year using a Department of Education approved universal screening assessment.
- Provide periodic assessments of students who exhibit a substantial deficiency in reading for the purpose of progress monitoring using a Department-approved progress monitoring assessment.
- Provide periodic assessments of students who exhibit a substantial deficiency in reading for the purpose of progress monitoring using a Department-approved progress monitoring assessment.
- Permit a student with a disability who has been determined to require an alternate assessment aligned to alternate academic achievement standards in reading to take an alternate assessment in addition to the universal screening and progress monitoring assessments required by 279.68 and IAC—62.
- Retention of any student who is not proficient in reading by the end of third grade, who did not attend the summer reading program, and who does not qualify for a good cause exemption from the retention requirement.

In addition to enacting the third grade retention policy, Iowa Code § 284.17 Sec. 73 requires the Department of Education to develop criteria and a process for school districts to use to establish specific performance goals and to evaluate the performance of each attendance center operated by a district in order to arrive at an overall school performance grade and report card for each attendance center. The information must be posted on the Department of Education's website with information for each attendance center listed separately.

The Department of Education will also develop an achievement score that calculates aggregate growth as well as aggregate proficiency of students when combined with other academic indicators resulting in an overall school performance grade for each attendance center in the school district. The performance grade may also be used as one measure to rank and classify schools into six different performance categories: exceptional, high performing, commendable, acceptable, needs improvement, and priority. A closing gap score will also be calculated as another measure to determine subgroup performance and to rank and classify attendance centers.

The state of Iowa was not granted an ESEA waiver by the United States Department of Education (USDOE). However, the federal influence and emphasis on accountability is reflected in the legislation described above.

Impact of Demographics on Student Learning

Fifty years ago, President Johnson addressed the country in the State of the Union address on January 8, 1964. During his address, the president initiated the "war on poverty" and persisted that it should become one of America's primary goals. Two years later, the *Equality of Educational Opportunity* (Coleman et al., 1966) was released. The report revealed that student achievement had little to do with school resources and more to do with the impact of students' family backgrounds. The report concluded that schools alone had very little influence on a student's achievement, only about 10% of the variances in student achievement. In an analysis of the Coleman Report, Byrk and Raudenbush (1992) examined 7,185 students from 160 schools in the sample for effect sizes and estimated that school-level variables account for 18% of the variance in student achievement when using a hierarchical linear model on mathematics achievement data. A noted criticism of Coleman's methodology was the use of verbal ability as the primary dependent measure as opposed to the students test scores on standardized tests (Madaus et al., 1979).

As a result of the report's findings, several researchers have replicated Coleman's use of the production-function model as the primary means of analyzing performance indicators (standardized tests) and the inputs that went into schools to produce learning (Gamoran & Long, 2006). Averch, Carroll, Donaldson, Kielsing, and Pincus (1974) examined the Coleman Report's use of production-function modeling and concluded that factors such as teacher experience or advanced degrees had no statistical effect on student outcomes. Reports publishing several critiques emerged challenging the results, particularly the cross-sectional measures of reading achievement and Coleman's estimation of school effects by measures of percent of variance explained by causal ordering (Sorensen & Morgan, 2000; Hanushek, 1979; Hanushek & Kain, 1972; Bowles & Levin, 1968).

However, in *Inequality: A Reassessment of the Effect of Family and Schooling in America*, Jenks et al. (1972) examined the report's findings and found that resources varied little among U.S. schools and concluded that once the critiques of "sampling procedures, information-gathering techniques, and analytical methods" were taken into account, the results "held up surprisingly well" (p. 70). The authors also concluded that after controlling for family background, school resources had little effect. Coleman and Jenks' conclusions have been substantiated by other research regarding the correlation between student achievement data and demographic data (Alspaugh, 1991; Maylone, 2002; Payne & Biddle, 1999; Roscigno & Ainsworth-Darnell, 1999; Sirin, 2005).

Schools across the United States continue to be segregated by income, race, and ethnicity. Schools serving more disadvantaged populations face greater challenges than their more affluent counterparts. Children from disadvantaged homes perform consistently lower on standardized achievement measures than children from middle-class and upper-middle class homes. Their grades are lower, they are more likely to drop out of school, and they are less likely to graduate from high school or attend post-secondary institutions. In his analysis of the influence of out-of-school factors on schools, Berliner (2009) states, “Poverty limits student potential; inputs to schools affect outputs” (p. 1).

Children residing in poorer neighborhoods face significantly different political, social, and economic pressures than children residing in more affluent neighborhoods. However, all children enter schools susceptible to the influence of what is going on in their communities beyond the school doors. The principle of “linked lives,” of the life-course perspective, states that lives of parents and children “are lived interdependently, and social and historical influences are expressed through this network of shared relationships” (Elder, 1998, p. 4). Numerous out-of-school factors have been shown to affect the academic achievement of disadvantaged students.

Parental Employment Status and Student Achievement

Research has identified maternal employment as one of the most influential predictors of disadvantaged children’s academic achievement. In 1960, approximately 40% of married women with school-age children worked outside of the home compared to 77% in 1996 (Cappella & Larner, 1999). Such an increase has had significant implications for children's academic achievement. Research indicates maternal employment has mixed results for middle-class children's academic achievement (Baum, 2004; Blau & Grossberg, 1992; Desai, Chase-Lansdale, & Michael, 1989), and positive or neutral effects on poor children's academic achievement (Chase-Lansdale et al., 2003; Huston et al., 2001; Milne et al., 1986; Moore & Driscoll, 1997; Morris, Huston, Duncan, Crosby, & Bos, 2001; Smith, Atkins, & Connell, 2003; Zaslow & Emig, 1997). Even though some research indicates that living in a single-parent family has minimal or no effect on children's outcome (Burchinal, Follmer, & Byrant, 1996; Ricciuti, 1999; Riciuti, 2004), living in a two-parent family has generally been shown to produce more positive outcomes for children than living in an single-parent family (Garfinkel & McLanahan, 1986; Krein & Beller, 1988; McLanahan, 1985; Mclanahan & Sandefur, 1994) or a family divided by divorce (Shinn, 1978; Wallerstein & Blakeslee, 1989).

In 1996, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) significantly increased the labor force participation rate for current and former welfare recipients, particularly for mothers with school-age children. In coordination with the earned income tax credit (EITC), the PRWOA pushed many welfare recipients to leave the system and become more reliant on labor force participation in order to support their families (Blank, 2002; Corcoran, Danziger, Kalil, & Seefeldt, 2000; Hofferth, & Harris, 2002). However, many of the maternal workforce settled into low-wage jobs that did not provide sufficient income to lift their families out of poverty (Lichter & Eggebeen, 1994; Zedlewski, 2002) and likely cut ties to social supports (i.e., food stamps, Medicaid, child care subsidies, etc.) (Zedlewski, 2002). With the increasing entry of mothers with school-age children into low-wage jobs as a result of the PWROA, coupled with the rise in school accountability measures since 1996, disadvantaged children's academic achievement has been negatively impacted.

Female-headed households are more likely to experience poverty than are other families (U.S. Census Bureau, 2003a), and disadvantaged children are more likely to live in single-parent families than their middle- and upper-class peers (U.S. Census Bureau , 2003b). According to Hokayem and Hennegeness' (2014) analysis of census data, "Women had higher rates of living near poverty compared with men (5.1% compared with 4.4%), they also had higher rates of living in poverty (16.3% compared to 3.6%)" (p. 7). Additionally, Hoyakem and Hennegeness' (2014) analysis found that "families composed of a female householder, no husband present, had the highest rate of living near poverty by family type (7.3%); they also had the highest rate of living in poverty (30.9%). The near-poverty and poverty rates for families with a male householder, no wife present, were 5.8%and 16.8%, respectively" (p. 9).

Beginning in the 1960s women entered the workforce at rates far surpassing any other time in history. As a result of this movement, research examining the effects of maternal employment on children's academic achievement has also increased. However, many of the women migrating into jobs were married and in typically middle-class White families. As a result, the research conducted has not revealed systematic differences between academic achievement of children of working and non-working mothers (Hoffman, 1989); however, research exists that presents slightly negative impacts of maternal employment on children's academic outcomes (Baum, 2004; Goldberg et al., 1996; Milne et al., 1986). On the contrary, research by Zick , Bryant, and Osterbacka

(2001) found a positive link between maternal employment and children's academic achievement. The study found that working mothers were more likely to engage in reading and homework with their children, which in turn leads to more positive academic outcomes for children.

Overall, the effects of maternal employment on children's academic achievement vary significantly. Research has decisively supported linkages between family attributes and children's access to educational resources (Roscigno, 1998) and between family economic status and children's academic achievement (Entwisle & Alexander, 1992).

Income Levels and Student Achievement

Researchers have been examining the impacts of poverty on student achievement since the inception of standardized assessments. Research supports that a student's socioeconomic background can be used to predict how a student performs on state standardized assessments (Tienken & Orlich, 2013; Maylone, 2001; Turnamian, 2012). In a meta-analysis of 34 studies spanning from 1988 through 2012 and from the United States and United Kingdom, researchers Cooper and Stewart (2013) found strong evidence to support that income level affects children's academic outcomes. Particularly, money in early childhood makes the most difference in cognitive outcomes.

Along similar lines, Sirin (2005) conducted a meta-analysis of 74 independent studies published between 1990 and 2000. Sirin (2005) sought to establish the relationship between socioeconomic factors (SES) and academic achievement. The sample size included 101,157 students form 6,871 schools in 128 school districts using 74 independent samples. Sirin (2005) conducted a replica of White's (1982) meta-analysis examining the SES and achievement correlation. The replication study sought to

(1) determine the extent to which a significant relation exists between SES and academic achievement based on research published between 1990 and 2000, (2) assess the influence of several moderating factors in this relation, and (3) estimate whether this relation has changed in comparison with the findings from White's (1982) study (Sirin, 2005). According to Sirin's (2005) findings, this study and White's (1982) study reveal that a "parents' location in the socioeconomic structure has a strong impact on students' academic achievement" (p. 438). White (1982) was able to determine that a combination of SES factors accounted for 75% of the variance in student achievement as measured by standardized tests. White (1982) further examined the idea that socioeconomic data would also be used to predict which students might be successful in college. He suggests that such predictions allowed colleges to exclude certain students based on parental income or community poverty levels.

While the largest studies (Coleman et al., 1966; Jencks, 1972) have garnered most of the attention on SES effects on student achievement, Sirin's (2005) study supports the correlation between school and community resources and student achievement. Jencks' (1972) research suggests that a student's family background, and in turn its effect on student achievement, renders school or community resources relatively powerless. Jencks (1972) proceeds to suggest that the determining factor, especially for students lacking family support or resources, of success to be "luck."

Researchers Coleman et al. (1966), Jencks (1972), Sirin (2005), and White (1982) have constructed statistically significant correlations between socioeconomic factors and student achievement. As a result, the research begs the question, "How is it possible that such poverty exists in the wealthiest, most powerful country in history?" Among the 35 most wealthy countries, the United States holds the distinction of ranking second highest in child poverty (Coley & Baker, 2013).

Regardless, researchers continue to examine the production function method of analysis utilized in Coleman's (1966) landmark study. By the 1990s, hundreds of studies of education production functions had been conducted. Greenwald, Hedges, and Laine (1996a, 1996b) and Hanushek (1997) reviewed many of these studies on SES impacts on student achievement. Greenwald et al. (1996a, 1996b) found an effect of school resources on student achievement whereas Hanushek (1997) did not find a persistent effect on school resources. The two sets of researchers utilized different criteria for including studies in the meta-analyses: "In spite of different outcomes, the researchers agreed on three points: (1) in at least some cases, higher levels of resources are associated with higher achievement, (2) the qualities of schools that produce these effects are hard to pin down, and (3) the ways in which resources are used is more consequential for achievement than presence or absence of resources" (Gamoran & Long, 2006, p. 8).

Family/Household Type and Student Achievement

For the purpose of this study, family and household type refers to families with both parents present, female- and male-only households, or lone-parent households.

The percentage of single-parent households has tripled in the past 50 years and has continued to grow larger among Latino and African American families when compared to the general population (U.S. Census, 2010). In most cases, women head the single-parent homes; single-father homes represent only 7% of the total single-parent homes in the country (DeBell, 2008). Research supports that children without fathers in the home graduate from high school and attend post-secondary institutions at a lower rate

(Sigle-Rushton & McLanahan, 2004) and perform worse on standardized tests (Bain, Boersma, & Chapman, 1983). Research concludes that growing up without a father has a greater negative impact on males as compared to females (Manadra & Murray, 2006; Sigle-Rushton & McLanahan, 2004). Shinn (1978) explains that in a review of literature, a majority of the studies "have shown detrimental effects of father absence on children's intellectual performance" (p. 295).

McLanahan and Sandefur (1994) summarize the research as follows:

> Children who grow up in a household with only one biological parent are worse off, on average, than children who grow up in a household with both of their biological parents, regardless of the parent's race or educational background, regardless of whether the parents are married when the child is born, and regardless of whether the resident parent remarries (p. 1).

Parents' Educational Attainment and Student Achievement

A review of the literature on student achievement has shown that parental education is vital in predicting children's achievement (Davis-Kean, 2005; Jimerson, Egeland, & Teo, 1999; Klebanov, Brooks-Gunn, & Duncan, 1994; Kohn, 1963; Luster, Rhodes, & Hass, 1989; Smith, Brooks-Gunn, & Klebanov, 1997).

Davis-Kean (2005) studied a cross-sectional sample of 8,688 12-year-olds and examined the power of the indirect role of parental expectations on the home environment and found that "the amount of schooling that parents receive influences how they structure their home environment as well as how they interact with their children in promoting academic achievement" (p. 300). These findings suggest parental level of education to be a significant aspect of SES family factors influencing student achievement (Turnamian, 2012).

Theoretical Framework and Production Function Theory

For the purpose of this study, the district is considered the institution. The inputs become the district variables identified in previous chapters. The output is the district Iowa Test of Basic Skills and Iowa Test of Education Development Grades 3 and 11 in Language Arts and Mathematics. Production Function Theory is the theoretical framework guiding this study. Turnamian (2012) explains that when applying the production function theory to the social sciences, it is implied that one or more inputs (independent variables) influence the output (dependent variable). This theory can be used to find the current rate of output, once inputs have been established (Solow, 1956).

According to Hanushek (1986), "The economics research on schooling is empirical in nature and an understanding of its findings must begin with an underlying conceptual model of the educational process. A natural starting point is the economic model of production theory and firm behavior" (p. 1142). Todd and Wolpin (2003) examined production function theory in an education setting and share that "education production function (EPF) . . . examines the productivity relationship between schooling inputs and test score outcomes" (p. 3). Todd and Wolpin's (2003) research provides a conceptual framework for understanding the choice of variables and in turn a coherent understanding of their effects. Production function theory helps direct the choice of independent variables (single parent household, parent's education level, etc.) and their impact on the dependent variable (standardized test scores).

CHAPTER III

METHODOLOGY

The purpose of this study was to identify which specific school community demographic factors and socioeconomic variables account for the greatest amount of variance in an Iowa school district's percentages of students scoring Proficient or above on the 2010 Iowa Test of Basic Skills (ITBS) for 3^{rd} grade in Mathematics and Language Arts and the 2010 Iowa Test of Educational Development (ITED) for 11^{th} grade in Mathematics and Language Arts. I purposely limited the focus to community demographic variables and their impact on school district ITBS and ITED scores for students in 3^{rd} and 11^{th} grades. I sought to add to the growing body of research that reveals the impact of community demographic factors on student achievement, as evidenced by standardized test scores. Multiple research studies and current literature support that community demographic variables account for significant variance in district test scores and in some cases even predictive capabilities. If the data continue to reveal the same result in regard to the impact socioeconomic and demographic data have on test scores, then the value of using district test scores to measure the quality of in-school variables may be in question.

Research Design

This research study was a non-experimental correlational, explanatory, cross-sectional design using hierarchical regression models as the primary instrument for data analysis. Research in the social sciences is not easily examined through experimentation (Kerlinger, 1986). As a result, correlational studies are often one of the frequently used research designs in the social sciences and can limit research from finding causality between two variables. However, non-experimental causal-comparative research designs do attempt to provide evidence of cause and effect relationships between variables and can be seen as a non-experimental research design, which may identify or suggest causality (Johnson, 2001). Gay and Airasian (2000) state, "Correlational research involves collecting data in order to determine whether, and to what degree, a relationship exists between two or more quantifiable variables" (p. 321). Johnson (2001) emphasizes that "it is essential to understand that correlation and regression (especially multiple regression) can be used for explanatory research (and for the control of extraneous variables) as well as for descriptive and predictive research" (p. 7). This correlational study collected data from the U.S. Census Bureau's five-year census data from 2010 and ITBS and ITED scores from 2010 as well.

In order to determine what combination of community school demographic variables have a statistically significant relationship to student achievement, I used both simultaneous and hierarchical regression models for the study. In Chapter II, I identified 15 school community demographic variables that are supported in research as having a relationship to student achievement. The extent to which these 15 variables, or the best combination of them related to student achievement, as measured by student performance on the 3rd and 11th grade ITBS/ITED in Mathematics and Language Arts, is currently not known. Since I did not know the best combination of community demographic variables that would best predict how students would perform on the test, a simultaneous regression was used.

Johnson (2001) explains that studies can typically be categorized as descriptive research, predictive research, or explanatory research. The three types of research are described below:

> To determine whether the primary objective was descriptive, one needs to answer the following questions: (a) Were the researchers primarily describing the phenomenon? (b) Were the researchers documenting characteristics of the phenomenon? If the answer is "yes" (and there is no manipulation) then the term *descriptive non-experimental research* should be applied. To determine whether the primary objective was predictive, one needs to answer the following question: Did the researchers conduct the research so that they could predict or forecast some event phenomenon in the future (without regard for cause and effect)? If the answer is "yes" (and there is no manipulation) then the term predictive *non-experimental research* should be applied. To determine whether the primary objective was explanatory, one needs to answer the following questions: (a) Were the researchers trying to develop or test a theory about a phenomenon to explain "how" and "why" it operates? (b) Were the researchers trying to explain how the phenomenon operates by identifying the causal factors that produce change in it? If the answer is "yes" (and there is no manipulation) then the term *explanatory research* should be applied. (Johnson, 2001, p. 9)

I used a predictive, explanatory non-experimental research study that builds on the work of Turnamian (2012), Jones (2008), and Maylone (2002). The predictive study sought to determine which combination of variables best predicts the criterion variable(s) (Turnamian, 2012, p. 101). Hanushek (1986), as cited in Turnamian (2012), explains that if predictor variables correlate well with a criterion, then making a prediction based on a combination of those variables will be more accurate than making a prediction based on just one variable (p. 102). Hanushek states, “A prediction study is an attempt to determine which of a number of variables are most highly related to the criterion variable. Prediction studies are conducted to facilitate decision making about individuals to aid in various types of selection, and to determine the predictive validity of measuring instruments” (p. 203). Turnamian used a prediction study to predict which combination of community demographic variables would best correlate and most predict how students would perform on the 2009 New Jersey Assessment of Skills and Knowledge (NJASK) for students in Grade 3 in Language Arts and Mathematics.

Multiple linear regression models were used to determine the statistical significance of community demographic variables on school district 2010 ITBS and ITED results in Grades 3 and 11 for Language Arts and Mathematics. The community demographic variables (independent variables) presented in Chapter II (see Figure 2) were identified in the literature as influencing student achievement as measured by standardized assessments (dependent variables) and provided the theoretical framework of the study. The strength of these variables’ relationship to school district 2010 ITBS and ITED in Grades 3 and 11 Language Arts and Mathematics is unknown.

15 School Community Demographic Variables

- Percentage of families below poverty
- Median district household income
- Percentage of families making $25,000 or less
- Percentage of families making $35,000 or less
- Percentage of household annual income above $200,000
- Percentage of two-parent families with children 6-17 years old
- Percentage of female-only households, no males
- Percentage of male-only households, no females
- Percentage of lone-parent household
- Percentage of population 25 years of older, no high school diploma
- Percentage of population 25 years or older, high school graduate
- Percentage of population 25 years or older, some college
- Percentage of population 25 years or older, bachelor's degree
- Percentage of population 25 years of older, advanced degree

Figure 2. 15 School community demographic variables.

Hinkle, Wiersman, and Jur (2003) contend, "The behavioral and social sciences could not exist without statistics. Behavioral scientists use statistics to explain the results of research studies and to provide empirical evidence to support or refute theories." The authors also explain that if characteristics of data are the same, then these characteristics are considered constant. However, when characteristics of the data are different, then these characteristics are considered variables. This study examined fifteen different independent variables and their influence and predictive power on one dependent variable through multiple linear regression.

"In multiple linear regression, we have a single criterion (Y) and multiple predictor variables (X_i). The multiple regression equation contains a regression coefficient (b_i) for each predictor variable and the regression constant (a)" (Hinkle et al., 2003, p. 462). The multiple linear regression seeks to test theoretical assumptions and examine the influence of several predictor variables in a sequential way so that the researcher can judge how much the new variable adds to the prediction of a given criterion over and above what can be accounted for by other important variables (Johnson, 2003, p. 10). The researcher is also looking for "the change in predictability associated with the addition of the new predictor variables entered earlier in the analysis" (Johnson, 2003, p. 11).

Conceptual Framework

Current literature and evidence strongly support household financial resources as an important key to children's learning outcomes. Researchers Cooper and Stewart (2013) reviewed 34 studies from OECD and European countries examining children's health, social, behavioral, and cognitive outcomes, along with maternal mental health, parenting, and the home environment: "Low income affects direct measures of children's well-being and development, including their cognitive ability, achievement and engagement in school, anxiety levels, and behavior. The evidence on cognitive development and school achievement was the clearest and most common" (Cooper & Stewart, 2013, p. 2).

This study built on the work of Maylone (2002) and Turnamian (2012) and examined five types of data (independent variables) addressing household income, including a district's median household income as opposed to a district's mean household income. These variables, along with other identified variables, were combined to find the three or more variables that would best predict student scores on the 3rd and 11th grade ITBS/ITED for students who scored proficient or above on Language Arts and Mathematics standardized assessments. The data were also analyzed to determine the combination of variables that show the greatest amount of variance in the test scores. For this study, the following data sources were obtained from the United States Census Bureau's American FactFinder website, and describe parental income level as the following:

1. Percentage of families below poverty
2. Median district household income
3. Percentage of families making $25,000 or less
4. Percentage of families making $35,000 or less
5. Percentage of families making above $200,000

In Construct 1, the diagram below shows the relationship between a district's income level and student achievement as measured by the 3rd and 11th grade ITBS/ITED scores in Language Arts and Mathematics. A district's income level is described as percentage of families below poverty, median district household income, percentage of families making $25,000 or less, percentage of families making $35,000 or less, percentage of families making above $200,000.

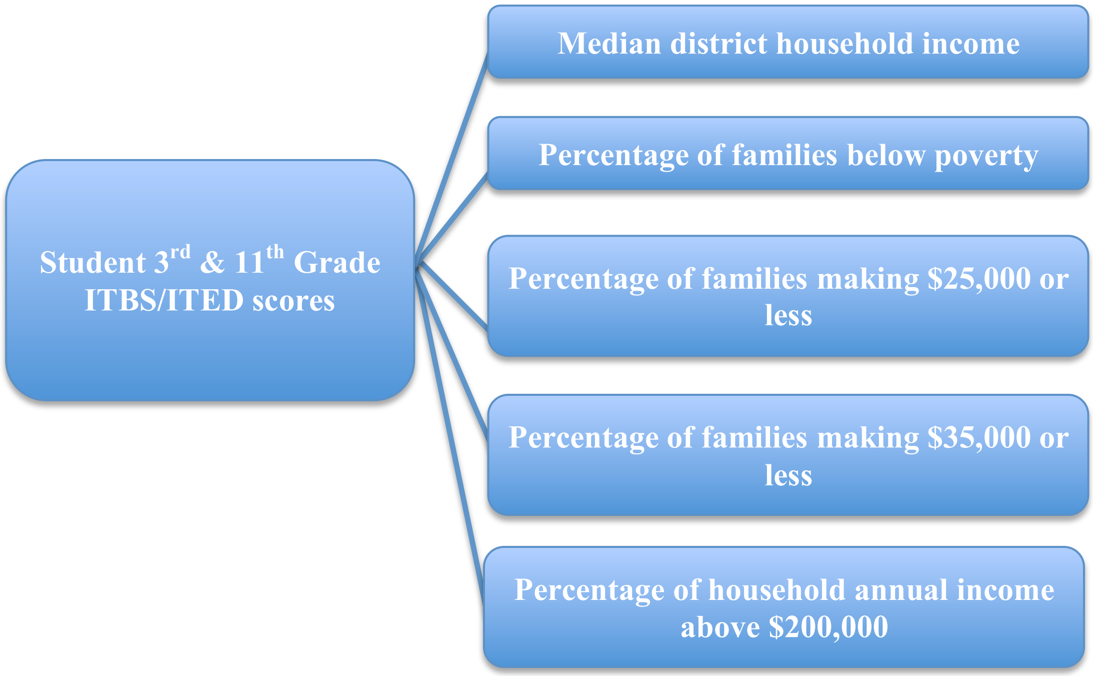

Figure 3. Annual district household income construct.

The next set of variables supported in research as showing the greatest impact on student achievement as measured by standardized test scores is family household type. This study built on Maylone's (2002) and Turnamian's (2013) studies, in which they looked at lone-parent household status. This study examined not only lone-parent households but also female-only households and male-only households. The category of household types was divided into four types of data: families with both parents and with children between the ages of 6-17, father-only households, mother-only households, and lone-parent household. These variables along with other variables were combined to find the three or more variables that best predict students scores on the 3rd and 11th grade ITBS/ITED scores for students who score proficient and above on Language Arts and

Mathematics standardized assessments. These data were also used to determine the combination of variables that show the greatest amount of variance in the test scores. For this study, the following data sources were obtained from the United States Census Bureau's American FactFinder website and describe family/household type as the following:

1. Percentage of two-parent families with children 6-17 years old
2. Percentage of female-only households, no males
3. Percentage of male-only households, no females
4. Percentage of lone-parent households

In Construct 2, the diagram below shows the relationship between a district's Family/Household type and structure and student achievement as measured by the 3rd and 11th grade ITBS/ITED scores in Language Arts and Mathematics. A district's family/household type is described as follows: families with both parents and children between the ages of 6-17, father-only households, mother-only households, and lone-parent household.

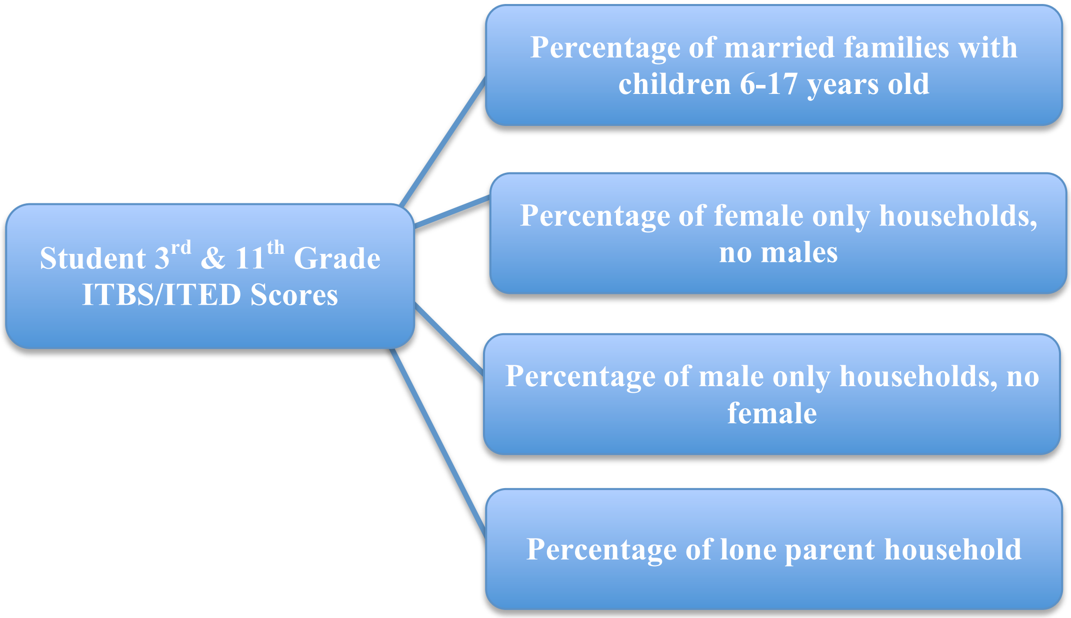

Figure 4. Annual district percentage lone-parent household construct.

The last set of variables that the research shows has the greatest impact on student achievement as measured by standardized test scores is parental education attainment. This study will be examined parental education levels. Parents' educational attainment is divided into five types of data: percentage of population 25 years or older, no high school diploma; percentage of population 25 years or older, high school graduate; percentage of population 25 years or older, some college; percentage of population 25 years or older, bachelor's degree; and percentage of population 25 years or older, advanced degree. These variables, along with other variables, were combined to find the three or more variables that best predict students' scores on the 3rd and 11th grade ITBS/ITED for students who scored proficient and above on Language Arts and Mathematics standardized assessments. These data were also used to determine the combination of variables that show the greatest amount of variance in the test scores. For this study, the following data sources were obtained from the Unites States Census Bureau's American FactFinder website and describe parental education attainment as follows:

1. Percentage of population 25 years or older, no high school diploma
2. Percentage of population 25 years or older, high school graduate
3. Percentage of population 25 years or older, some college
4. Percentage of population 25 years or older, bachelor's degree
5. Percentage of population 25 years or older, advanced degree

In Construct 3, the diagram below shows the relationship between parents' educational attainment level and student achievement as measured by 3rd and 11th grade ITBS/ITED scores in Language Arts and Mathematics.

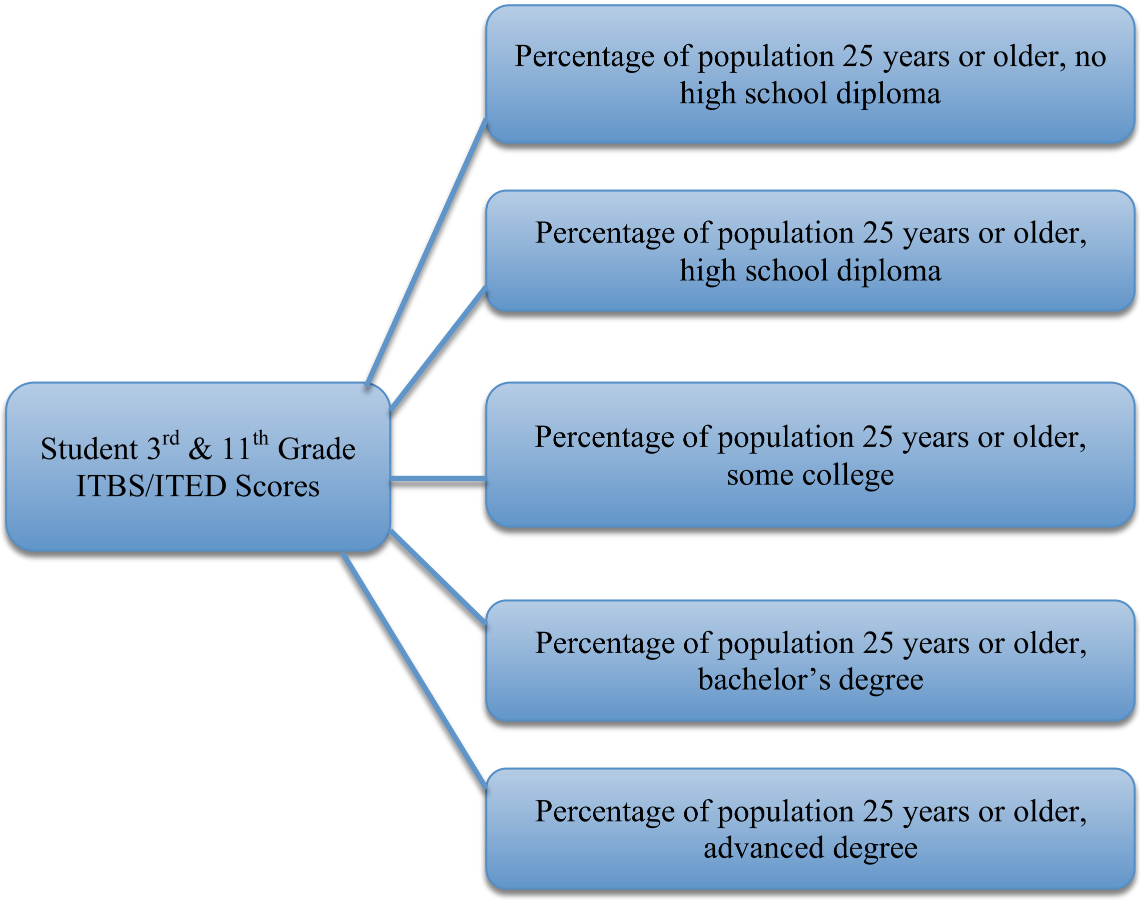

Figure 5. Annual district percentage parental education construct.

An additional variable was explored beyond those examined by Jones (2002), Maylone (2002), and Turnamian (2012). Percentage of parents in the household working is also supported in literature as having an impact on student achievement. This variable was added to the regression model.

Research Questions

This study was guided by two comprehensive research questions:

1. Which combination of school community demographic factors best predicts how students performed on the 2010 3rd and 11th grade ITBS/ITED assessments in regard to scoring proficient or higher?

2. Which combination of school community demographic factors account for the greatest amount of variance in how students performed on the 2010 ITBS/ITED assessments?

After extensively reviewing the literature, the following 20 research questions were created to address the two comprehensive research questions:

Subsidiary Research Question 1:

How much variance in the 2010 3rd grade ITBS/ITED scores in Language Arts can be explained by the income level construct (Figure 3) for Iowa school districts?

Subsidiary Research Question 2:

How much variance in the 11th grade ITBS/ITED scores in Language Arts can be explained by the income level construct (Figure 3) for Iowa school districts?

Subsidiary Research Question 3:

How much variance in the 2010 3rd grade ITBS/ITED scores in Mathematics can be explained by the income level construct (Figure 3) for Iowa school districts?

Subsidiary Research Question 4:

How much variance in the 2010 11th grade ITBS/ITED scores in Mathematics can be explained by the income level construct (Figure 3) for Iowa school districts?

Subsidiary Research Question 5:

How much variance in the 2010 3rd grade ITBS/ITED scores in Language Arts can be explained by the family/household type construct (Figure 4) for Iowa school districts?

Subsidiary Research Question 6:

How much variance in the 2010 11th grade ITBS/ITED scores in Language Arts can be explained by the family/household type construct (Figure 4) for Iowa school districts?

Subsidiary Research Question 7:

How much variance in the 2010 3rd grade ITBS/ITED scores in Mathematics can be explained by the income level construct (Figure 4) for Iowa school districts?

Subsidiary Research Question 8:

How much variance in the 2010 11th grade ITBS/ITED scores in Mathematics can be explained by the income level construct (Figure 4) for Iowa school districts.

Subsidiary Research Question 9:

How much variance in the 2010 3rd grade ITBS/ITED scores in Language Arts can be explained by the parents' educational attainment construct (Figure 5) for Iowa school districts?

Subsidiary Research Question 10:

How much variance in the 2010 11th grade ITBS/ITED scores in Language Arts can be explained by the parents' educational attainment construct (Figure 5) for Iowa school districts?

Subsidiary Research Question 11:

How much variance in the 2010 3rd grade ITBS/ITED scores in Mathematics can be explained by the parents' educational attainment construct (Figure 5) for Iowa school districts?

Subsidiary Research Question 12:

How much variance in the 2010 11th grade ITBS/ITED scores in Mathematics can be explained by the parents' educational attainment construct (Figure 5) for Iowa school districts?

Subsidiary Research Question 13:

Which combination of school community demographic factors shows the most variance in students' 3rd grade ITBS/ITED scores in Language Arts?

Subsidiary Research Question 14:

Which combination of school community demographic factors shows the most variance in students' 11th grade ITBS/ITED scores in Language Arts?

Subsidiary Research Question #15:

Which combination of school community demographic factors shows the most variance in students' 3rd grade ITBS/ITED scores in Mathematics?

Subsidiary Research Question 16:

Which combination of school community demographic factors shows the most variance in students' 11th grade ITBS/ITED scores in Mathematics?

Subsidiary Research Question 17:

Which combination of school community demographic factors best predicts how students performed on the 2010 3rd grade ITBS/ITED in Language Arts?

Subsidiary Research Question 18:

Which combination of school community demographic factors best predicts how students performed on the 2010 11th grade ITBS/ITED in Language Arts?

Subsidiary Research Question 19:

Which combination of school community demographic factors best predicts how students performed on the 2010 3rd grade ITBS/ITED in Mathematics?

Subsidiary Research Question 20:

Which combination of school community demographic factors best predicts how students performed on the 2010 11th grade ITBS/ITED in Mathematics?

Null Hypotheses

Null Hypothesis 1:

No statistically significant relationship exists between 2010 3rd grade ITBS/ITED scores in Language Arts and the income level construct for Iowa school districts.

Null Hypothesis 2:

No statistically significant relationship exists between 2010 11th grade ITBS/ITED scores in Language Arts and the income level construct for Iowa school districts.

Null Hypothesis 3:

No statistically significant relationship exists between 2010 3rd grade ITBS/ITED scores in Mathematics and the income level construct for Iowa school districts.

Null Hypothesis 4:

No statistically significant relationship exists between 2010 11th grade ITBS/ITED scores in Mathematics and the income level construct for Iowa school districts.

Null Hypothesis 5:

No statistically significant relationship exists between 2010 3rd grade ITBS/ITED scores in Language Arts and the family/household type construct for Iowa school districts.

Null Hypothesis 6:

No statistically significant relationship exists between 2010 11th grade ITBS/ITED scores in Language Arts and the family/household type construct for Iowa school districts.

Null Hypothesis 7:

No statistically significant relationship exists between 2010 3rd grade ITBS/ITED scores in Mathematics and the family/household type construct for Iowa school districts.

Null Hypothesis 8:

No statistically significant relationship exists between 2010 11th grade ITBS/ITED scores in Mathematics and the family/household type construct for Iowa school districts.

Null Hypothesis 9:

No statistically significant relationship exists between 2010 3rd grade ITBS/ITED scores in Language Arts and the parental education attainment construct for Iowa school districts.

Null Hypothesis 10:

No statistically significant relationship exists between 2010 11th grade ITBS/ITED scores in Language Arts and the parental education attainment construct for Iowa school districts.

Null Hypothesis 11:

No statistically significant relationship exists between 2010 3rd grade ITBS/ITED scores in Mathematics and the parental education attainment construct for Iowa school districts.

Null Hypothesis 12:

No statistically significant relationship exists between 2010 11th grade ITBS/ITED scores in Mathematics and the parental education attainment construct for Iowa school districts.

Null Hypothesis 13:

There are no statistically significant combinations of out of-school-variables that show significant variance in students' 3rd grade ITBS/ITED scores in Language Arts for an Iowa school district.

Null Hypothesis 14:

There are no statistically significant combinations of out-of-school variables that show significant variance in students' 11th grade ITBS/ITED scores in Language Arts for an Iowa school district.

Null Hypothesis 15:

There are no statistically significant combinations of out-of-school variables that show significant variance in students' 3rd grade ITBS/ITED scores in Mathematics for an Iowa school district.

Null Hypothesis 16:

There are no statistically significant combinations of out-of-school variables that show significant variance in students' 11th grade ITBS/ITED scores in Mathematics for an Iowa school district.

Null Hypothesis 17:

There is no statistically significant research-based combination of out-of-school variables that have reliable predictive power for the 2010 3rd grade ITBS/ITED scores in Language Arts for Iowa school districts.

Null Hypothesis 18:

There is no statistically significant research-based combination of out-of-school variables that have reliable predictive power for the 2010 11th grade ITBS/ITED scores in Language Arts for Iowa school districts.

Null Hypothesis 19:

There is no statistically significant research-based combination of out-of-school variables that have reliable predictive power for the 2010 3rd grade ITBS/ITED scores in Mathematics for Iowa school districts.

Null Hypothesis 20:

There is no statistically significant research-based combination of out-of-school variables that have reliable predictive power for the 2010 11th grade ITBS/ITED scores in Mathematics for Iowa school districts.

Population

This study examined student achievement as measured by the 2010 3rd and 11th grade ITBS/ITED scores for Language Arts and Mathematics. All the school district data collected for this study were obtained from the Iowa Department of Education's website. In 2010, the State of Iowa supported 358 school districts. The target population for this study is all school districts in the state of Iowa that have at least 20 students taking the 2010 ITBS/ITED in Grades 3 and 11 in Language Arts and Mathematics, according to the 2010 census data. I have included 45% of the school districts in Iowa during the 2009-2010 school year. In order to achieve representation of urban, suburban, and rural districts, a stratified random sampling method was chosen. The sample of 160 school districts consists of all state-identified urban districts and suburban districts. The remaining school districts represent state-identified rural districts.

Data Collection

Data about the dependent variables of the 2010 Grades 3 and 11 ITBS/ITED in Language Arts and Mathematics for Iowa school districts were readily available through the annual publication of the Iowa Condition of Education Report. The ITBS/ITED scores are reported as not proficient (NP), proficient (P), and advanced (A). For the purpose of this student, proficient and advanced scores were combined to indicate an overall passing rate. The data were downloaded directly from the Iowa Department of

Education website into an Excel spreadsheet, where it could be more easily analyzed alongside the data for the independent variables (see Appendices).

Data about the remaining independent variables (employment status, income levels, family/household type, educational attainment) for each Iowa school district were gathered from the United States Census Bureau website, American FactFinder. The data were collected from the American Community Survey (ACS) section of the website. This nationwide survey is one aspect of the U.S. Census Bureau's decennial program:

> The ACS began in 1996 and has expanded each subsequent year. Full nationwide implementation began in January 2005 for housing units and in January 2006 for group quarters (GQ). Starting with the 2005 ACS, one-year estimates have been available for geographic areas with populations of 65,000 or more. In 2008, the first three-year estimates were released for geographic areas with populations of 20,000 or more. For small areas (less than 20,000 population), it will take five years to accumulate large enough samples to provide estimates with accuracy similar to the decennial census. Beginning in 2010, and every year thereafter, the nation will have these five-year period estimates available, a resource that shows change over time, even for neighborhoods and rural areas. (American FactFinder, 2010, p. 1)

All of the American Community Survey data were placed into an Excel file and merged with the various grade level variables. The Excel file included both dependent variable (grade level) and the independent variables. The 2005-2010 ACS five-year estimates were used for this study based on data collected from January 2005 and December 2010. The five-year estimates represent a larger sample size and include data for small geographic areas, an integral component for the rural districts represented in the sample (U.S. Census Bureau, n.d.).

Instrumentation

For Iowa, in the years prior to 2011-2012, the state administered test for district accountability was the Iowa Test of Basic Skills (ITBS) for Grades 3-8 and the Iowa Test of Educational Development (ITED) for Grade 11. In 2011-2012, the Iowa Testing Program released new forms of the tests and renamed them the Iowa Assessments. Prior to 2011-2012, the ITBS and ITED results were used for reporting Annual Yearly Progress (AYP) in accordance with No Child Left Behind and statewide Annual Progress Reporting (APR). The Iowa Tests have been utilized by Iowa school districts since 1935; and according to the ITBS research guide, the assessments "measure growth in fundamental areas of school achievement: vocabulary, reading comprehension, language, mathematics, social studies, science, and sources of information" (ITBS, 2014, p. 1). The ITBS and ITED are norm-referenced assessments seeking to compare each student with other students across the nation taking the same assessment.

Reliability

The Iowa Testing Program (2014) suggests that reliability can be quantified by a number of statistical data, such as the following:

> Such data [however] reduce to two basic types of indices. The first of these is the reliability coefficient. In numerical value, the reliability coefficient is between .00 and .99, and generally for standardized tests between .60 and .95. The closer the coefficient approaches the upper limit, the greater the freedom of the test scores from the influence of factors that temporarily

> affect student performance and obscure real differences in achievement. The second of the statistical indices used to describe test reliability is the standard error of measurement. This index represents a measure of the net effect of all factors leading to inconsistency in the interpretation of that performance. (p. 63)

According to the Iowa Testing Program's *Technical Manual* for the Iowa Test of Basic Skills, the Kunder–Richardson Formula 20 (K-R_{20}) method was used to establish internal-consistency elements (see Figure 6).

Test Summary Statistics
***Iowa Tests of Basic Skills* — Complete Battery, Form A**
2000 National Standardization

RS=Raw Scores   SS=Developmental Standard Scores

Level 5 Kindergarten		Vocabulary **V**	Word Analysis **WA**	Listening **Li**	Language **L**	Mathematics **M**	**Core Total CT**	Reading Profile Total **RPT**
Number of items		29	30	29	29	29		
Fall								
RSs	Mean	17.3	15.8	16.3	15.5	16.2		
	SD	4.7	5.7	5.1	5.3	4.7		
	SEM	2.3	2.4	2.5	2.4	2.3		
SSs	Mean	121.7	121.4	122.7	123.3	121.4	121.8	122.0
	SD	13.1	12.9	9.3	8.6	8.9	9.0	8.9
	SEM	6.4	5.5	4.5	3.9	4.4	2.9	3.2
Reliability	K-R_{20}	*.763*	*.820*	*.770*	*.797*	*.748*	*.896*	*.873*
Spring								
RSs	Mean	20.2	19.8	20.2	19.9	20.9		
	SD	4.0	5.2	5.0	4.9	4.6		
	SEM	2.2	2.3	2.3	2.3	2.1		
SSs	Mean	131.1	131.5	130.8	131.1	130.7	130.8	130.9
	SD	15.0	14.3	10.8	9.4	9.8	9.8	11.1
	SEM	8.2	6.3	4.9	4.4	4.5	3.4	3.8
Reliability	K-R_{20}	*.699*	*.806*	*.793*	*.788*	*.793*	*.877*	*.882*

Figure 6. Test summary statistics *Iowa Test of Basic Skills*, Complete Battery Form A, 2000 National Standardization

Level 6 Grade 1		Vocabulary V	Word Analysis WA	Listening Li	Language L	Mathematics M	Core Total CT	Reading Words RW	Reading Comprehension RC	Reading Total RT	Reading Profile Total RPT
Number of items		31	35	31	31	35		29	19	48	
Fall											
RSs	Mean	18.8	21.5	18.2	16.1	19.9		18.4	8.5	27.5	
	SD	4.9	5.8	5.1	5.5	5.8		6.3	4.4	10.0	
	SEM	2.4	2.5	2.5	2.5	2.6		2.3	1.9	3.0	
SSs	Mean	138.1	138.9	138.1	138.3	138.3	138.2	139.1	139.1	139.0	138.6
	SD	16.0	15.9	11.9	11.0	11.3	10.9	10.2	10.2	9.1	12.3
	SEM	7.9	6.9	5.8	5.0	5.1	3.6	3.7	4.5	2.7	2.7
Reliability	K-R_{20}	*.754*	*.811*	*.764*	*.790*	*.793*	*.893*	*.871*	*.805*	*.909*	*.953*
Spring											
RSs	Mean	22.2	25.7	22.7	21.6	25.1		24.4	13.7	38.1	
	SD	4.3	5.2	4.5	4.9	5.6		5.1	4.8	9.6	
	SEM	2.3	2.3	2.2	2.3	2.4		1.7	1.6	2.4	
SSs	Mean	150.9	152.2	150.4	151.5	150.2	151.4	152.2	152.2	151.5	151.3
	SD	18.0	18.4	13.5	13.4	13.6	12.7	14.3	14.3	13.5	12.6
	SEM	9.4	8.2	6.6	6.2	5.7	4.2	4.8	4.8	3.4	3.1
Reliability	K-R_{20}	*.725*	*.800*	*.758*	*.786*	*.821*	*.890*	*.886*	*.889*	*.937*	*.938*

Figure 6 (cont'd.). Test summary statistics *Iowa Test of Basic Skills*, Complete Battery Form A, 2000 National Standardization

Validity

Cronbach (1971) established an important point about test validity by stating, "In the end, the responsibility for valid use of a test rests on the person who interprets it. The published research merely provides the interpreter with some facts and concepts. He has to combine these with his other knowledge about the person he tests . . ." (p. 445). In defining the role of validity in the testing of subjects, the American Educational Research Association (1999) "refers to the degree to which evidence and theory support interpretations of test scores entailed by proposed uses of tests" (p. 9).

The ITBS Research Guide (2012) states the following:

> The procedures used to develop and revise test materials and interpretive information lay the foundation for test validity. Meaningful evidence based on test scores, not to mention desirable consequences from those inferences, can only provide test scores with social utility if test development produces meaningful test materials. Content quality is thus the essence of arguments or test validity (ITBS, 2012, p. 26).

In the development of ITBS Forms A & B, the Iowa Testing Program utilized the national item tryout approach as detailed in Figure 7. The Iowa Tests "are a result of an extended, iterative process during which 'experimental' test materials are developed and administered to national and state samples to evaluate their measurement quality and appropriateness" (ITBS, 2012, p. 28).

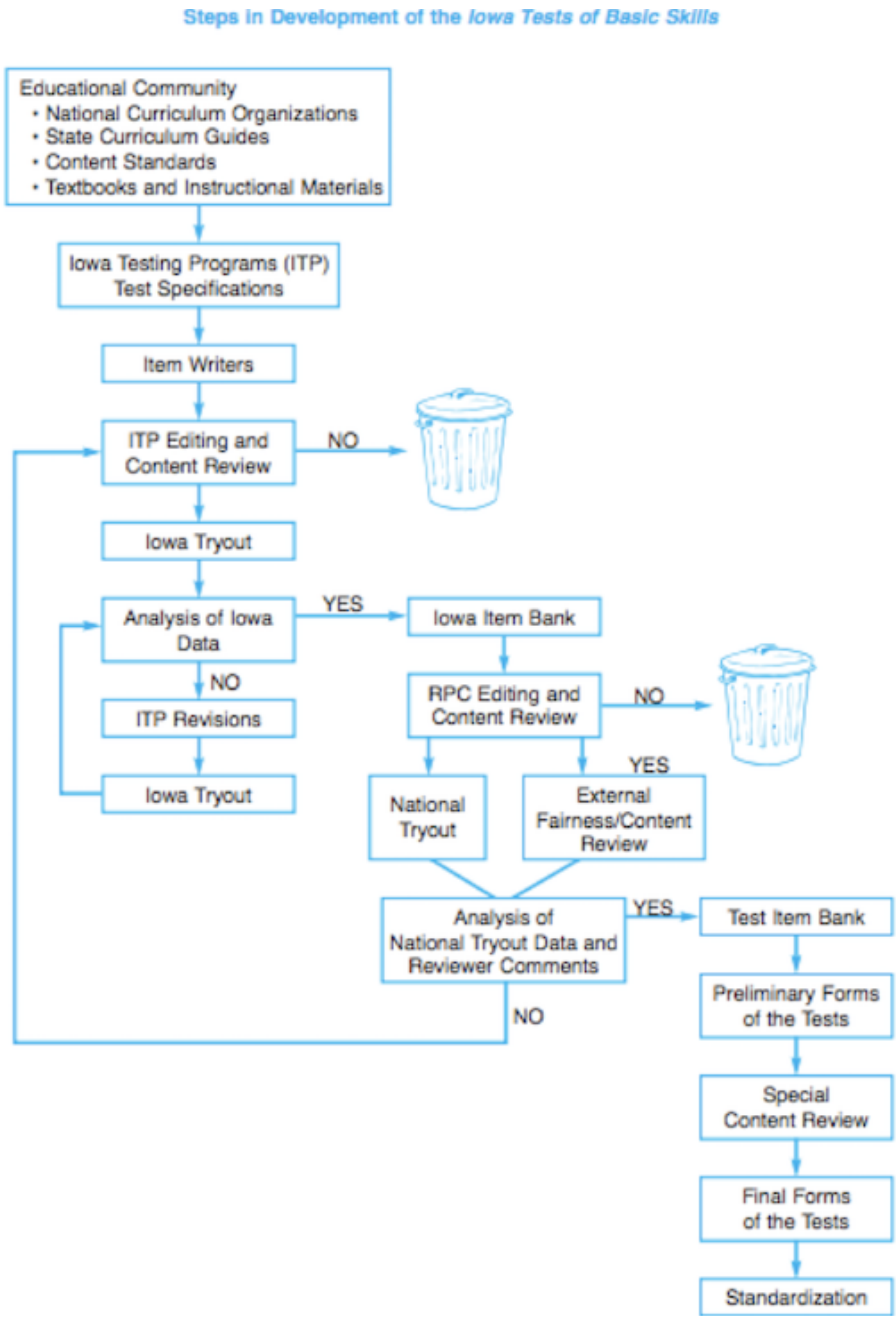

Figure 7. Steps in the development of the Iowa Test of Basic Skills.

However, the creators of the Iowa Assessments recommend schools view the validity of the Iowa Test of Basic Skills and Iowa Test of Educational Development through the following lenses:

1. Are the skills and abilities required for successful test performance those that are appropriate for students in our school?
2. Are our standards of content and instructional practices represented in the test questions? (ITBS, 2012, p. 26).

Although the Iowa Testing Program recommends local districts use discernment in choosing the appropriateness of an assessment, the state utilizes the ITBS and ITED to meet federal accountability laws and to determine Annual Measurable Objectives (AMOs). In the 2010 *State Report Card for No Child Left Behind*, the Iowa Department of Education clearly states the use of ITBS and ITED in order to determine Adequate Yearly Progress (AYP) and for the process of deciding when to designate districts or schools as "in need of assistance." In other words, the ITBS and ITED are used to make high-stakes decisions about school districts, schools, teachers, and students. Tienken and Rodriguez (2010) explain one reason for significant variance of standard error of measurement (SEM) in individual test scores to be the number of questions on a test used to measure student understanding of a particular standard. The researchers claim there are simply too few.

Methods

Data Collection

The data for this dissertation were obtained from two primary sources: the Iowa

Department of Education website and the U.S. Census Bureau's American FactFinder website. The literature review provides evidence of the following independent variables representing constructs of income levels, family/household type, parent educational attainment, and employment status. This study examined 15 independent variables (out-of-school factors) segmented into four constructs:

1. Employment Status is defined as follows: Percentage of families in workforce
2. Income Level is defined as follows:
    a. Percentage of families below poverty
    b. Median district household income
    c. Percentage of families making $25,000 or less
    d. Percentage of families making $35,000 or less
    e. Percentage of household annual income above $200,000
3. Family/Household Type is defined as follows:
    a. Percentage of female-only households, no males
    b. Percentage of male-only households, no females
    c. Percentage of lone-parent household
    d. Percentage of two-parent families with children 6-17 years old
4. Parental Education Attainment is defined as follows:
    a. Percentage of population 25 years or older, no high school diploma
    b. Percentage of population 25 years or older, high school graduate
    c. Percentage of population 25 years or older, some college
    d. Percentage of population 25 years or older, bachelor's degree
    e. Percentage of population 25 years or older, advanced degree

The dependent variables for this study were the 2010 3rd and 11th grade ITBS/ITED scores in Language Arts and Mathematics of students who scored proficient or above on the ITBS/ITED.

Data for each of the 15 community demographic variables were obtained from the United States Census Bureau's American Community Survey section, which was a five -year estimate. The five-year estimate gave the researcher the largest possible sample size. The website American FactFinder was used to find the necessary data.

The researcher reviewed relevant literature supported by similar research conducted by Turnamian (2012), Jones (2008), and Maylone (2002) along with various studies that support mean district household income as the first variable that influences student achievement, as measured by standardized test scores. This study built on the work of Turnamian (2012) and Maylone (2002). Maylone (2002) researched the mean district household income, combined with percentage of district lone-parent households and the percentage of students receiving free and reduced lunch, to predict students' Michigan Educational Assessment program (MEAP) scores. Turnamian (2012) continued to build on this research by looking at a combination of five variables: percentage of population with a bachelor's degree, percentage of lone-parent households, percentage of population with an advanced degree, percentage of families below poverty and percentage of economically disadvantaged families to explain the greatest amount of variance on the 2009 NJ ASK 3 in Language Arts scores. In addition, Turnamian (2012) examined the combination of percentage of families with less than $30,000 annual income, percentage of population with a high school diploma and some college, percentage of population with a high school diploma, and percentage of population with no high school diploma in order to ascertain the greatest amount variance in NJ ASK 3 Math scores.

The dependent variables for this study were the 3rd and 11th grade passing scores on the 2010 ITBS and ITED in Language Arts and Mathematics. In order to calculate the percentage of students in the Language Arts and Mathematics ITBS/ITED, the researcher combined the students who scored proficient and advanced. The dependent variables for this study were as follows:

- Percentage of students passing the 2010, 3rd grade ITBS in Language Arts
- Percentage of students passing the 2010, 3rd grade ITBS in Mathematics
- Percentage of students passing the 2010, 11th grade ITED in Language Arts
- Percentage of students passing the 2010, 11th grade ITED in Mathematics

All data utilized for this study are publicly available information that can be found on public websites such as the Iowa Department of Education and American FactFinder. I found all the school districts that met the established criteria of at least 20 students in Grades 3 and 11 that took the ITBS/ITED (I did not include regional high schools) and placed all those districts in an Excel spreadsheet. I then took all the ITBS/ITED scores of students scoring proficient and advanced and transferred that information onto the same Excel spreadsheet with the census data. The 15 community demographic variables were based on a five-year estimate from the U.S. Census bureau website, American FactFinder. Once this was complete, I created two Excel spreadsheets that contained all the elements listed previously (ITBS/ITED scores, school district names, out-of-school variables), which were divided by grade level. Each grade level was intended to be its own study.

Alignment of Data

Since this study utilized two primary websites for its data collection, the researcher first had to make sure that each school district in the sample had all 15 variables present in the U.S. Census data. If information was missing from either the ITBS/ITED scores for a specified grade level or out-of-school variable data from the U.S. Census, then the district was excluded from the sample. After going through the Excel spreadsheets and aligning the data, it was found that 160 school districts met the criteria to be considered in this study. Once all the Excel spreadsheets proved accurate, they were uploaded into SPSS, where a correlational analysis was performed on each dependent variable. Correlational coefficients were also generated for each of the 15 independent variables.

SPSS Data Entry

After the data were merged into the Excel spreadsheet, the spreadsheet was uploaded into SPSS (Statistical Package for the Social Sciences), where the correlational analysis was done for each dependent variable. Correlation coefficients were generated for each independent variable and the dependent variable.

Stepwise Multiple Regressions

After examining the correlational outputs, the stepwise regression procedure enters the selected variables based on their level of significance (e.g., $p < .05$). The regression enters variables one at a time starting with the most significant; otherwise, the variable with the lowest p-value.

The stepwise multiple regressions for the dependent variable of 2010 3rd Grade Language Arts ITBS scores produced three models. The stepwise multiple regressions for the dependent variable of 2010 3rd Grade Mathematics ITBS scores produced two models. The stepwise multiple regressions for the dependent variable of 2010 11th Grade Language Arts ITED scores produced three models. The stepwise multiple regressions for the dependent variable of 2010 11th Grade Mathematics ITED scores produced six models.

Maylone (2002) found the numerical coefficients for three SES factors that predicted 56% of the variance in his sample:

1. Percentage of students eligible for free or reduced-price lunches
2. Percentage of district lone-parent households
3. Mean annual district household income

These three values were combined with the SPSS generated numerical constant to create the following predictor equation:

$$-0.226a + -0.767b + .00014c + 64.533 =$$

a = Percentage of students eligible for free or reduced-price lunch

b = Percentage of district lone-parent households

c = Mean annual district household income

For the purpose of this study, a similar algorithm was created for each of the 14 models identified through the stepwise regression method. The algorithm was then applied to 100% of the sample in a new column labeled Predictive Model with the model number. Another column was added next to the Predictive Model labeled Difference (Diff.) in order to establish the difference between the predicted and actual scores. Another column was added next to the Difference column labeled Standard Error of Estimates (+) that added the Standard Error of Estimate (SEE) to the Predictive Model.

Last, another column was added next to the Standard Error of Estimates (-) that subtracted the Standard Error of Estimate (SEE) from the Predictive Model. The actual 2010 3rd Grade Language Arts and Mathematics ITBS scores for each district were then subtracted from the predicted score. Next, the actual 2010 11th Grade Language Arts and Mathematics ITED scores for each district were then subtracted from the predicted score. The result was entered as the Diff. score.

As a final step, the Standard Error of Estimate (SEE) for each model was entered at the bottom of the Difference column. Districts that fell within the Standard Error of Estimate (SEE) were tallied and then placed over the total number of districts in the sample, 160 districts. For example, 113 districts fell within the SEE of 8.3 for 3rd Grade Language Arts ITBS scores, leaving a total of 71% of Iowa districts whose predicted LAL scores fell within the SEE.

Analysis Strategy

The data for this study were analyzed by creating a database for each dependent variable. The total population for the study included 160 school districts. Simultaneous multiple linear regressions, stepwise regressions, and hierarchical linear regressions were generated by uploading each dependent variable database into the SPSS (Statistical Package for the Social Sciences) predictive analytics software. An ANOVA (analysis of variance) was generated for each dependent variable. The *F*-statistic was analyzed to determine if each regression model was statistically significant. To determine which model explained the greatest variance in each dependent variable, an analysis of each model's R^2 (coefficient of determination) was conducted. The main purpose of the R^2 is to determine how well variables in the model will predict future outcomes based on their explanation of variance in the dependent variable. Within each model the independent variables reported a standardized beta coefficient, which was used to compare the strength of the effect of each independent variable on the dependent variable within each statistically significant model.

The most significant threats to the reliability and validity of the regression models were the impact of multicollinearity on the independent variables. Muticollinearity occurs when more than one of the predictor variables in a multiple linear regression model is highly related. For example, the percentage of households making less than $35,000 a year and the percentage of households making less than $25,000 a year are likely to be highly related. Multicollinearity does not impact the overall predictive power of a regression model. However, it can cause individual coefficient estimates to change erratically. This can negatively impact calculations regarding the predictive power of individual school districts. Since a major aspect of this study included the application of the formula created by Maylone (2002) to individual school districts, multicollinearity had to be given serious consideration.

Tolerance and variance inflation factors (VIF) values for each predictor in the models are used to measure the degree of multicollinearity between predictive variables in a multiple regression model. Tolerance is the reciprocal of VIF. Tolerance = $1 - R^2$ as opposed to VIF = 1/tolerance. A VIF less than 2 is often considered a strong indication that multicollinearity does not significantly impact predictor variables in a regression model (Field, 2009, 2013).

The betas and constants from the stepwise regressions were applied to the formula created by Maylone (2002) and added to the database for each dependent variable. These formulas generated a predicted score and the total labeled as the difference. The difference was calculated for each dependent variable for each school district.

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

The purpose of this study was to determine which combination of 15 community demographic factors account for the greatest amount of variance and can best predict an Iowa school district's percentage of students scoring proficient or above on the 2010 Iowa Test of Basic Skills (ITBS) and Iowa Test of Education Development (ITED) for 3rd and 11th grade Language Arts and Mathematics. The research sought to explore the potential validity of the use of standardized tests as the primary means of determining a school's success or failure. If community demographic factors are found to explain significant variance in district test scores, as supported in existing literature, the utility of using district test scores to measure the quality of in-school factors may be in question.

In order to determine which combination of community demographic factors best predicted how students performed on the 2010 3rd grade ITBS and 11th grade ITED in Language Arts and Mathematics, a stepwise linear multiple regression analysis was used to analyze the data (Cohen, Cohen, West, & Aiken, 2003).

Research Questions

After an extensive review of the research, empirical evidence exists to support the premise of looking at various community demographic factors as a means of predicting how students in any given state perform on their standardized assessments (Maylone, 2002; Turnamian, 2012; Tienken & Orlich, 2013). The two research questions that drove this study were as follows:

1. How much variance in the 2010 ITBS 3 and ITED 11 test results in Language

Arts and Mathematics is explained by community demographic factors?

2. Which community demographic factors account for the greatest amount of variance in a school district's percentage of students passing the 2010 ITBS 3 and ITED 11?

Summary of Bivariate Correlational Findings for the Dependent Variables

For this study, the 2010 Iowa 3rd Grade ITBS and 11th Grade ITED Language Arts and Mathematics school district scores were considered the dependent variables and paired with the following independent variables:

- Percentage of families below poverty
- Median district household income
- Percentage of families making $25,000 or less
- Percentage of families making $35,000 or less
- Percentage of household annual income above $200,000
- Percentage of two-parent families with children 6-17 years old
- Percentage of female-only households, no males
- Percentage of male-only households, no females
- Percentage of lone-parent household
- Percentage of population 25 years or older, no high school diploma
- Percentage of population 25 years or older, high school graduate
- Percentage of population 25 years or older, some college
- Percentage of population 25 years or older, bachelor’s degree
- Percentage of population 25 years or older, advanced degree
- Percentage of parents working

For sections of this study the ledger below will be used to abbreviate the variables for ease of understanding:

Variable	Variable Shortened
2010 3rd Grade Language Arts	% 3rd Grade LA Proficiency
2010 3rd Grade Mathematics	% 3rd Grade Math Proficiency
2010 11th Grade Language Arts	% 11th Grade LA Proficiency
2010 11th Grade Mathematics	% 11th Grade Math Proficiency
Percentage of families below poverty	% families below poverty
Median district household income	Median income
Percentage of families making \$25,000 or less	% less \$25K
Percentage of families making \$35,000 or less	% less %35K
Percentage of household annual income above \$200,000	% \$200,000 or more
Percentage of families with children 1-17 years old	% families with children
Percentage of female-only households, no males	% female-only parent
Percentage of male-only households, no females	% male-only parent
Percentage of lone-parent household	% single parent
Percentage of population 25 years or older, no high school diploma	% no high school
Percentage of population 25 years or older, high school graduate	% high school degree
Percentage of population 25 years or older, some college	% some college
Percentage of population 25 years or older, bachelor's degree	% bachelor's degree

Percentage of population 25 years or older, advanced degree	% advanced degree
Percentage of parents working	% employed

Tables 1 through 4 provide the descriptive statistics for the four stepwise regressions.

Table 1

Descriptive Statistics for 3rd Grade Language Arts Stepwise Regression

Descriptive Statistics

	Mean	Std. Deviation	N
% 3rd Grade LA Proficiency	78.2674	9.09421	159
% families below poverty	12.0108	7.56948	159
Median income	52361.459	11924.8799	159
% less $25k	10.9992	4.21002	159
% less $35k	11.0972	3.62209	159
% $200,000 or more	2.5314	2.00764	159
% families with children	29.4484	6.88673	159
% female only parent	5.4566	1.60064	159
% male only parent	2.4109	.73599	159
% single parent	7.8675	2.08120	159
% no high school	5.2875	2.58640	159
% high school degree	34.5514	9.23349	159
% some college	22.0158	3.72206	159
% bachelor's degree	16.2572	6.64609	159
% advanced degree	7.0543	5.74843	159

Table 2

Descriptive Statistics for 3rd Grade Mathematics Stepwise Regression

Descriptive Statistics

	Mean	Std. Deviation	N
% 3rd Grade Math Proficiency	79.2311	9.53385	159
% families below poverty	12.0108	7.56948	159
Median income	52361.459	11924.8799	159
% less $25k	10.9992	4.21002	159
% less $35k	11.0972	3.62209	159
% $200,000 or more	2.5314	2.00764	159
% families with children	29.4484	6.88673	159
% female only parent	5.4566	1.60064	159
% male only parent	2.4109	.73599	159
% single parent	7.8675	2.08120	159
% no high school	5.2875	2.58640	159
% high school degree	34.5514	9.23349	159
% some college	22.0158	3.72206	159
% bachelor's degree	16.2572	6.64609	159
% advanced degree	7.0543	5.74843	159

Table 3

Descriptive Statistics for 11th Grade Language Arts Stepwise Regression

Descriptive Statistics

	Mean	Std. Deviation	N
% 11th Grade LA Proficiency	79.9141	7.25466	159
% families below poverty	12.0108	7.56948	159
Median income	52361.459	11924.8799	159
% less $25k	10.9992	4.21002	159
% less $35k	11.0972	3.62209	159
% $200,000 or more	2.5314	2.00764	159
% families with children	29.4484	6.88673	159
% female only parent	5.4566	1.60064	159
% male only parent	2.4109	.73599	159
% single parent	7.8675	2.08120	159
% no high school	5.2875	2.58640	159
% high school degree	34.5514	9.23349	159
% some college	22.0158	3.72206	159
% bachelor's degree	16.2572	6.64609	159
% advanced degree	7.0543	5.74843	159

Table 4

Descriptive Statistics for 11th Grade Mathematics Stepwise Regression

Descriptive Statistics

	Mean	Std. Deviation	N
% 11th Grade Math Proficiency	79.9133	7.84690	159
% families below poverty	12.0108	7.56948	159
Median income	52361.459	11924.8799	159
% less $25k	10.9992	4.21002	159
% less $35k	11.0972	3.62209	159
% $200,000 or more	2.5314	2.00764	159
% families with children	29.4484	6.88673	159
% female only parent	5.4566	1.60064	159
% male only parent	2.4109	.73599	159
% single parent	7.8675	2.08120	159
% no high school	5.2875	2.58640	159
% high school degree	34.5514	9.23349	159
% some college	22.0158	3.72206	159
% bachelor's degree	16.2572	6.64609	159
% advanced degree	7.0543	5.74843	159

To determine the significance, strength, and direction of the relationship between each independent variable and ITBS 3 and ITED 11 Language Arts and Mathematics scores, the Pearson Correlation Coefficient (see Appendix A) for each relationship was calculated using SPSS software.

Interpretation of Pearson Correlation for Dependent Variable: 2010 3rd and 11th Grade Iowa Test of Basic Skills/Iowa Test of Educational Development Scores for Language Arts and Mathematics

To determine the significance, strength, and direction of the relationship between each independent variable and the 2010 ITBS/ITED 3rd and 11th Grade Language Arts and Mathematics scores, the Pearson Correlational Coefficient for each relationship was calculated using SPSS software. The correlation coefficient ranges from -1.00 to 1.00. A positive value implies a positive association and positive linear relationship, whereas a large independent variable tends to be associated with a larger dependent variable. Conversely, a negative association and negative linear relationship implies a larger independent variable tends to be associated with a smaller dependent variable (Gay & Airasian, 2000). When determining the strength of the relationship, the negative and positive signs are ignored. The closer the number is to -1 or 1, the stronger the relationship, 1 being the strongest possible relationship whereas 0.0 indicates the absence of a relationship. In order to interpret the correlational coefficient, the scale below was used (see Table 5) from Hinkle, Wiersma, & Jurs (2003):

Table 5
Pearson Correlation Coefficients

Size of Correlation	**Interpretation**
.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (.00 to -.30)	Little if any correlation

Interpretation of the Pearson Correlation Coefficients for 2010 3rd Grade ITBS Language Arts Scores

The percentage of no high school diploma (% no high school) proved to have a low negative correlation with 2010 3rd grade ITBS Language Arts scores. As the percentage of no high school diplomas (% no high school) increases, the 3rd grade Language Arts scores decrease. The percentage of families below poverty (% families below poverty) proved to have a low negative correlation with 2010 3rd grade ITBS Language Arts scores. As the percentage of families below poverty (% families below poverty) increases, the 3rd grade Language Arts scores decrease. The percentage of female-only households (% female-only parent) proved to have a low negative correlation with 2010 3rd grade ITBS Language Arts scores. As the percentage of female-only households (% female-only parent) increases, the 3rd grade Language Arts scores decrease.

The percentage of households with some college (% some college) proved to have little or no correlation with 2010 3rd grade ITBS Language Arts scores. The percentage of households with a high school degree (% high school degree) proved to have little or no correlation with 2010 3rd grade ITBS Language Arts scores.

Table 6

Pearson Correlation Coefficient for the 14 Independent Variables and the 2010 ITBS 3rd Grade Language Arts Scores where N = 159

Variable	**Pearson Correlation Coefficient**
% no high school degree	-.343**
% female-only parent	-.336**
% families below poverty	-.324**
% single parent	-.321**
Median income	.262**
% bachelor's degree	.261**
% less 25K	-.246**
% less 35K	-.223**
% $200,00 or more	-.216**
% male-only parent	-.191*

% families with children	.168*
% advanced degree	.136
% high school degree	-.062
% some college	-.035

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Interpretation of Pearson Correlation for Dependent Variable: 2010 3rd Grade Iowa Test of Basic Skills Scores for Mathematics

The percentage of single-parent households (% single parent) proved to have a low negative correlation with 2010 3rd grade ITBS Mathematic scores. As the percentage of single-parent households (% single parent) increases, the 3rd grade Mathematics scores decrease. The percentage of no high school diploma (% no high school) proved to have a low negative correlation with 2010 3rd grade ITBS Mathematic scores. As the percentage of no high school diplomas (% no high school) increases, the 3rd grade Mathematics scores decrease. The percentage of families making less than $25,000 year (% less 25K), families with a percentage of some college attainment (% some college), and two-parent families with children 6-17 years old (% families with children) proved to have little or no correlation with 2010 3rd grade ITBS Mathematic scores.

The percentage of families with some college attainment (% some college) proved to have little to no correlation with both 2010 3rd grade ITBS Language Arts and Mathematic scores.

Table 7

Pearson Correlation Coefficient for the 14 Independent Variables and the 2010 ITBS 3rd Grade Mathematics Scores where N = 159

Variable	**Pearson Correlation Coefficient**
% single parent	-.309**
% no high school	-.291**
% female-only parent	-.289**
% male-only parent	-.287**
% families below poverty	-.249**
% bachelor's degree	-.241**
% less 25K	-.222**
% advanced degree	.221**
% $200,000 or more	.204**
Median Income	.168*
% high school degree	-.132
% less 35K	-.093
% some college	-.024
% families with children	.014

** Correlation is significant at the 0.0 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Interpretation of Pearson Correlation for Dependent Variable: 2010 11th Grade Iowa Test of Educational Development Scores for Language Arts

The percentage of no high school diploma (% no high school) proved to have a low negative correlation with 2010 11th grade ITED Language Arts scores. As the percentage of no high school diploma (% no high school) increases, the 11th grade Language Arts scores decrease. The percentage of bachelor's degree (% bachelor's degree) proved to have a low positive correlation with 2010 11th grade ITED Language Arts scores. As the percentage of bachelor's degrees (% bachelor's degree) increases, the 11th grade Language Arts scores increase. The percentage of single-parent homes (% single parent) proved to have a low negative correlation with 2010 11th grade ITED Language Arts scores. As the percentage of single-parent homes (% single parent) increases, the 11th grade Language Arts scores decrease. The percentage of families making less than $35,000 a year (% less 35K) and families with a percentage of making over $200,000 or more (% $200,000 or more) proved to have little or no correlation with 2010 11th grade ITED Language Arts scores.

Table 8

Pearson Correlation Coefficient for the 14 Independent Variables and the 2010 ITED 11th Grade Language Arts Scores where N = 159

Variable	Pearson Correlation Coefficient
% no high school	-.377**
% bachelor's degree	.346**
% single parent	-.344**
% female only	-.320**

% male only	-.299**
% families below poverty	-.286**
Median income	.256**
% $200,000 or more	.229**
% less $35K	-.202*
% advanced degree	.191*
% less $25K	-.174*
% high school degree	-.171*
% some college	-.082
% families with children	.019

** Correlation is significant at the 0.0 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Interpretation of Pearson Correlation for Dependent Variable: 2010 11th Grade Iowa Test of Educational Development Scores for Mathematics

The Percentage of no high school diploma (% no high school) proved to have a low negative correlation with 2010 11th grade ITED Mathematics scores. As the percentage of no high school diploma (% no high school) increases, the 11th grade Mathematics scores decrease. The percentage of female-only households (% female only) proved to have a low negative correlation with 2010 11th grade ITED Mathematics scores. As the percentage of female-only households (% female only) increases, the 11th grade Mathematics scores decrease. Median income (median income) proved to have a low positive correlation with 2010 11th grade ITED Mathematics scores. As the median income (median income) increases, the 11th grade Mathematics scores decrease. The percentage of single-parent homes (% single parent) proved to have a low negative correlation with 2010 11th grade ITED Mathematics scores. As the percentage of single-parent homes (% single parent) increases, the 11th grade Mathematics scores decrease. The percentage of families with children (% families with children) and percentage of families with high school degrees (% high school degree) proved to have little or no correlation with 2010 11th grade ITED Mathematics scores.

Table 9

Pearson Correlation Coefficient for the 14 Independent Variables and the 2010 ITED 11th Grade Mathematic Scores where N = 159

Variable	**Pearson Correlation Coefficient**
% no high school	-.353**
% female only	-.345**
Median income	.335**
% single parent	-.320**
% families below poverty	-.286**
% bachelor's degree	.273**
% $200,000 or more	.232**
% less $35K	-.210**
% male only	-.194*
% less $25K	-.174*
% some college	-.121
% advanced degree	.114
% families with children	.099

% high school degree	-.094

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Results of Stepwise Multiple Regression of Dependent Variable: Language Arts

After examining the Pearson Correlation Coefficient for each variable and determining the significance of each relationship, a stepwise linear multiple regression analysis of the predictor variables and dependent variable was conducted. The decision to use a stepwise linear multiple regression analysis protocol was based on previous research completed in this area (Turnamian, 2012) in order to provide an analytic framework and facilitate comparative discussion in Chapter 5.

Interpretation of Stepwise Multiple Regression Model Summary for 2010 ITBS 3rd Grade Language Arts Scores

The stepwise multiple regression estimates the impact of three models (see Table 10) on 2010 3rd grade ITBS Language Arts scores. For Model 1 the predictor percentage of population with no high school diploma (% no high school), reports an *R* Square of .118, which explains 11.8% of the variance in the dependent variable % 3rd grade LA proficiency. In Model 2 when the predictor percentage of female-only households (% female-only parent) is included, an *R* Square of .165 is reported. Therefore, Model 2 demonstrates the combination of predictors: percentage of no high school diploma (% no high school) and predictor percentage of female-only households (% female-only parent) and explains 16.5% of the variance in the dependent variable % 3rd grade LA Proficiency. The *R* Square change from Model 1 to Model 2 was .047, which indicated that 4.7% of the variance is added by the percentage of female-only households (% female-only parent). The *R* Square change was statistically significant $F(1,156) = 8.36119$, $p < .003$. In Model 3 when the predictor percentage of population of families with children (% families with children) is added, an *R* Square of .189 is reported. Therefore, Model 3 demonstrates that the combination of predictors percentage of no high school diploma (% no high school), percentage of population of female-only households (% female-only parent), and percentage of families with children (% families with children) explains 18.9% of the variance in the dependent variable % 3rd grade LA Proficiency. The *R* Square change from Model 2 to Model 3 was .039, which shows that 3.9% of the variance was now added by the percentage of families with children (% families with children). The *R* Square change was statistically significant $F(1,155) = 8.19073$, $p <$ .007.

Table 10

Stepwise Multiple Regression Model Summary for 2010 ITBS 3rd Grade Language Arts Scores

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.343[a]	.118	.112	8.56802	.118	21.003	1	157	.000	
2	.407[b]	.165	.155	8.36119	.047	8.863	1	156	.003	
3	.452[c]	.204	.189	8.19073	.039	7.561	1	155	.007	1.795

a. Predictors: (Constant), % no high school

b. Predictors: (Constant), % no high school, % female only parent

c. Predictors: (Constant), % no high school, % female only parent, % families with children

d. Dependent Variable: % 3rd Grade LA Proficiency

The stepwise multiple regression model for 2010 ITBS 3rd grade Language Arts scores met the assumption that the residuals are normally distributed and uncorrelated with the predictors as evidenced by a Durbin-Watson statistic of 1.795. A Durbin-Watson value between 1 and 4 indicates that this assumption for multiple regression was met (Field, 2009).

Table 11 displays the results of the ANOVA for this hierarchical regression model. The ANOVA estimates the impact of three separate models on the dependent variable. The ANOVA demonstrates all three models are statistically significant.

Model 1 is significant at the .000 level, $F = 21.003$, $df = 1,158$.

Model 2 is significant at the .000 level, $F = 15.459$, $df = 1, 158$.

Model 3 is significant at the .000 level, $F = 13.260$, $df = 1, 158$.

Table 11

ANOVA Stepwise Multiple Regression Model for 2010 ITBS 3rd Grade Language Arts Scores

ANOVA[a]

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	1541.829	1	1541.829	21.003	.000[b]
	Residual	11525.517	157	73.411		
	Total	13067.346	158			
2	Regression	2161.462	2	1080.731	15.459	.000[c]
	Residual	10905.884	156	69.910		
	Total	13067.346	158			
3	Regression	2668.687	3	889.562	13.260	.000[d]
	Residual	10398.659	155	67.088		
	Total	13067.346	158			

a. Dependent Variable: % 3rd Grade LA Proficiency

b. Predictors: (Constant), % no high school

c. Predictors: (Constant), % no high school, % female-only parent

d. Predictors: (Constant), % no high school, % female-only parent, % families with children

The coefficient table demonstrates how each predictor influences the dependent variable, % 3rd Grade LA proficiency (see Table 12) as each is entered into the hierarchical regression model. In Model 1, the predictor percentage of population without high school diplomas reports a beta = -.343. It is statistically significant at the .000 level, t = -4.583 and it contributes 11.8% of the explained variance to the model. The beta is negative, which means as the percentage of population with no high school diploma (% no high school) increases, 2010 ITBS 3rd grade Language Arts scores decrease. As a predictor variable percentage of population without high school diplomas (% no high school) is a strong predictor of students who scored proficient or higher on the 2010 ITBS 3rd grade Language Arts. In Model 2, the predictor percentage of population without high school diplomas (% no high school) decreases in power from a beta of -.343 to -.250 when the variable female-only households (% female-only parent) is entered. It is statistically significant, $p < .002$ level, $t = -3.139$, and now contributes 6.3% of the explained variance to the outcome variable. The predictor variable added in Model 2, percentage population with female-only households (% female-only parent) reports a beta = -.237. It is statistically significant at the .003 level, $t = -2.977$ and contributes 5.6% of the explained variance to the overall model. The beta is negative, which means as the percentage of population with female-only households (% female-only parent) increases, 2010 ITBS 3rd grade Language Arts scores decrease. The percentage of no high school diploma (% no high school) continues to be a statistically significant predictor of 2010 ITBS 3rd grade Language Arts.

In Model 3, the predictor percentage of no high school diploma (% no high school) decreases in power from a beta of -.250 to -.197. It is statistically significant, *p* <

.015 level, t = -2.455, and contributes 3.9% of the explained variance in the outcome variable. The predictor percentage of female-only households (% female-only parent) increased in power from a beta of -.237 to -302. It is statistically significant at p = .000 level, t = -3.710 and contributes 9.1% of the explained variance to the overall model. The predictor variable percentage population of families with children (% families with children), reports a beta = .208. It is statistically significant at the .007 level, t = 2.750 and contributes 4.3% of the explained variance to the overall model. The beta is positive, which means as the percentage of families with children (% families with children) increases, 2010 ITBS 3rd grade Language Arts scores increase. The predictor variable percentage of no high school diploma (% no high school diploma) had the weakest influence of the three predictor variables in Model 3. Percentage of female-only households (% female-only parent) was the strongest predictor of the 2010 ITBS 3rd grade Language Arts. With the addition of predictors in Models 2 and 3, the percentage of population with no high school diploma (% no high school) decreases in power.

The VIF for all predictors in all the models fell below the threshold of 2.00 and all tolerance levels were greater than .2 (Field, 2009, 2013), suggesting that the models do not have problems with multicollinearity.

Table 12

Standardized Coefficient Betas and Tolerance for Stepwise Multiple Regression Model for 2010 ITBS 3rd Grade Language Arts Scores

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	84.654	1.550		54.603	.000		
	% no high school	-1.208	.264	-.343	-4.583	.000	1.000	1.000
2	(Constant)	90.262	2.416		37.359	.000		
	% no high school	-.879	.280	-.250	-3.139	.002	.844	1.185
	% female only parent	-1.347	.452	-.237	-2.977	.003	.844	1.185
3	(Constant)	83.233	3.484		23.892	.000		
	% no high school	-.693	.282	-.197	-2.455	.015	.796	1.256
	% female only parent	-1.719	.463	-.302	-3.710	.000	.772	1.295
	% families with children	.274	.100	.208	2.750	.007	.899	1.112

a. Dependent Variable: % 3rd Grade LA Proficiency

Results of Stepwise Multiple Regression of Dependent Variable: Mathematics

After examining the Pearson Correlation Coefficient for each variable and determining the significance of each relationship, a stepwise linear multiple regression analysis of the predictor variables and dependent variable was conducted. The models were assessed at the .05 level of significance, which is most commonly used in social science research for significance with an alpha of .05, where $p < .05$ (Gay, Mills, & Airasian, 2012).

Interpretation of Stepwise Multiple Regression Model Summary for 2010 ITBS 3rd Grade Mathematics Scores

The stepwise multiple regression estimates the impact of two models (see Table 13) on 2010 ITBS 3rd grade Mathematics scores. For Model 1, the predictor percentage of population with a single-parent home (% single parent) reports an *R* Square of .095 and explains 9.5% of the variance in the dependent variable, % 3rd grade Math proficiency. In Model 2, when the predictor percentage of no high school diploma (% no high school) is included, an *R* Square of .122 is reported. Therefore, Model 2 demonstrates the combination of predictors: percentage of single-parent homes (% single parent) and predictor percentage of no high school diploma (% no high school) explains 12.2% of the variance in the dependent variable, % 3rd grade Math proficiency. The *R* Square change from Model 1 to Model 2 was .027, which indicated that 2.7% of the variance is added by the percentage population of no high school diploma (% no high school). The *R* Square change is statistically significant $F = (1, 156) = 4.756$, $p < .031$.

Table 13

Stepwise Multiple Regression Model Summary for 2010 ITBS 3rd Grade Mathematics Scores

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.309[a]	.095	.089	9.09733	.095	16.526	1	157	.000	
2	.349[b]	.122	.111	8.99045	.027	4.755	1	156	.031	1.792

a. Predictors: (Constant), % single parent

b. Predictors: (Constant), % single parent, % no high school

c. Dependent Variable: % 3rd Grade Math Proficiency

The stepwise multiple regression model for 2010 ITBS 3rd grade Mathematics scores met the assumption that the residuals are normally distributed and uncorrelated with the predictors as evidenced by a Durbin-Watson statistic of 1.792. A Durbin-Watson value of between 1 and 4 indicates that this assumption for multiple regression was met (Field, 2009).

Table 14 displays the results of the ANOVA for this hierarchical regression model. The ANOVA estimates the impact of two separate models on the dependent variable. The ANOVA demonstrates both models are statistically significant.

Model 1 is significant at the .000 level, F = 16.526, df = 1,158.

Model 2 is significant at the .000 level, F = 10.838, df = 1, 158

Table 14

ANOVA for Stepwise Multiple Regression Model for 2010 ITBS 3rd Grade Mathematics Scores

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1367.746	1	1367.746	16.526	.000[b]
	Residual	12993.542	157	82.761		
	Total	14361.288	158			
2	Regression	1752.077	2	876.039	10.838	.000[c]
	Residual	12609.211	156	80.828		
	Total	14361.288	158			

a. Dependent Variable: % 3rd Grade Math Proficiency

b. Predictors: (Constant), % single parent

c. Predictors: (Constant), % single parent, % no high school

The coefficient table demonstrates how each predictor influences the dependent variable, % 3rd grade Mathematics proficiency (see Table 15) as each is entered into the hierarchical regression model. In Model 1, the predictor percentage of population with a single-parent home (% single parent) reports a beta = -309. It is statistically significant at the .000 level, t = -4.056, and it contributes 9.5% of the explained variance to the model. The beta is negative, which means as the percentage of population with single parent homes increases, 2010 ITBS 3rd grade Mathematics scores decrease. In Model 2, the predictor percentage of single-parent homes (% single parent) decreases in power from a beta of -.309 to -.219 when the variable percentage population of no high school diploma (% no high school) is entered. The R Square change from Model 1 to Model 2 was .122, which indicated that 12.2% of the variance is added by the percentage population of no high school diploma (% no high school). It is significant, *p* < .011, *t* = -2.569. The predictor variable added in Model 2, percentage population with no high school diploma (% no high school), reports a beta = -.687. It is statistically significant at the .031 level, t = -2.181. The beta is negative, which means as the percentage population with no high school diploma (% no high school), increases, 2010 ITBS 3rd grade Mathematics scores decrease.

With the addition of predictors in Models 2, the percentage of population with single-parent homes (% single parent) slightly decreases in power. The VIF for all predictors in all the models fell below the threshold of 2.00 and all tolerance levels were greater than .2 (Field, 2009, 2013), suggesting that the models do not have problems with multicollinearity.

Table 15

Standardized Coefficient Betas and Tolerance for Stepwise Multiple Regression Model for 2010 ITBS 3rd Grade Mathematics Scores

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	90.353	2.829		31.933	.000					
	% single parent	-1.414	.348	-.309	-4.065	.000	-.309	-.309	-.309	1.000	1.000
2	(Constant)	90.772	2.803		32.386	.000					
	% single parent	-1.005	.391	-.219	-2.569	.011	-.309	-.201	-.193	.771	1.297
	% no high school	-.687	.315	-.186	-2.181	.031	-.291	-.172	-.164	.771	1.297

a. Dependent Variable: % 3rd Grade Math Proficiency

Results of Stepwise Multiple Regression of Dependent Variable: Language Arts

After examining the Pearson Correlation Coefficient for each variable and determining the significance of each relationship, a stepwise linear multiple regression analysis of the predictor variables and dependent variable was conducted. The models were assessed at the .05 level of significance, which is most commonly used in social science research for significance with an alpha of .05, where $p < .05$ (Gay, Mills, & Airasian, 2012).

Interpretation of Stepwise Multiple Regression Model Summary for 2010 ITED 11th Grade Language Arts Scores

The stepwise multiple regression estimates the impact of three models (see Table 16) on 2010 ITED 11th grade Language Arts scores. For Model 1, the predictor percentage of population with no high school diploma (% no high school) reports an *R* Square of .142, which explains 14.2% of the variance in the dependent variable, 11th grade LA Proficiency. In Model 2, when the predictor percentage of female-only households (% female-only parent) is included, an *R* Square of .177 is reported. Therefore, Model 2 demonstrates the combination of predictors percentage of no high school diploma (% no high school) and predictor percentage of female-only households (% female-only parent) explains 17.7% of the variance in the dependent variable, % 11th grade LA proficiency. The *R* Square change from Model 1 to Model 2 was .035, which indicated that 3.5% of the variance is now added by the percentage of female-only households (% female-only parent). The *R* Square change was statistically significant $F(1, 156) = 6.614$, $p < .011$.

In Model 3, when the predictor percentage of population with a bachelor's degree (% bachelor's degree) is added, an *R* Square of .203 is reported. Therefore, Model 3 demonstrates that the combination of predictors percentage of no high school diploma (% no high school), percentage of female-only households (% female parent), and percentage of population with a bachelor's degree (% bachelor's degree) explains 20.3% of the variance in the dependent variable, % 11th Grade Language Arts Proficiency. The *R* Square change from Model 2 to Model 3 was .026, which was statistically significant $F(1, 155) = 5.067$, $p < .026$.

Table 16

Stepwise Multiple Regression Model Summary for 2010 ITED 11th Grade Language Arts Scores

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.377[a]	.142	.137	6.74105	.142	25.994	1	157	.000	
2	.421[b]	.177	.166	6.62368	.035	6.614	1	156	.011	
3	.451[c]	.203	.188	6.53899	.026	5.067	1	155	.026	2.028

a. Predictors: (Constant), % no high school

b. Predictors: (Constant), % no high school, % female only parent

c. Predictors: (Constant), % no high school, % female only parent, % bachelor's degree

d. Dependent Variable: % 11th Grade LA Proficiency

The stepwise multiple regression model for 2010 ITED 11th grade Language Arts scores met the assumption that the residuals are normally distributed and uncorrelated with the predictors as evidenced by a Durbin-Watson statistic of 2.028. A Durbin-Watson value between 1 and 4 indicates that this assumption for multiple regression was met (Field, 2009).

Table 17 displays the results of the ANOVA for this hierarchical regression model. The ANOVA estimates the impact of three separate models on the dependent variable in three different models. The ANOVA demonstrates all three models are statistically significant.

Model 1 is significant at the .000 level, $F = 25.994$, $df = 1,158$.

Model 2 is significant at the .000 level, $F = 16.768$, $df = 1, 158$.

Model 3 is significant at the .000 level, $F = 13.159$, $df = 1, 158$.

Table 17

ANOVA for Stepwise Multiple Regression Model for 2010 11th Grade Language Arts Scores

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1181.199	1	1181.199	25.994	.000[b]
	Residual	7134.363	157	45.442		
	Total	8315.562	158			
2	Regression	1471.360	2	735.680	16.768	.000[c]
	Residual	6844.202	156	43.873		
	Total	8315.562	158			
3	Regression	1688.002	3	562.667	13.159	.000[d]
	Residual	6627.560	155	42.758		
	Total	8315.562	158			

a. Dependent Variable: % 11th Grade LA Proficiency

b. Predictors: (Constant), % no high school

c. Predictors: (Constant), % no high school, % female only parent

d. Predictors: (Constant), % no high school, % female only parent, % bachelor's degree

The coefficient table demonstrates how each predictor influences the dependent variable, % 11th grade Language Arts proficiency (see Table 18). In Model 1, the predictor percentage of population with no high school diploma (% no high school) reports a beta = -.377. It is statistically significant at the .000 level, t = -5.098, and it contributes 14.2% of the explained variance to the model. The beta is negative, which means as the percentage of population with no high school diploma (% no high school) increases, 2010 ITED 11th grade Language Arts scores decrease. In Model 2, the predictor percentage of no high school diplomas (% no high school) decreases in power from a beta of -.377 to -.297 when the variable percentage female-only households (% female-only parent) is entered. It is statistically significant, p < .000, t = -3.752 and now contributes 8.8% of the explained variance to the outcome variable. The predictor variable added in Model 2, percentage of population with female-only households (% female-only parent), reports a beta = -.203. It is statistically significant at the .011 level, $t = -2.572$ and contributes 4.1% of the explained variance to the overall model. The beta is negative, which means as the percentage of population with female-only households (% female parent) increases, 2010 ITED 11th grade Language Arts scores decrease. Both percentage of population with no high school diploma (% no high school) and percentage of population with female-only households (% female parent) were statistically significant predictors of 2010 ITED 11th grade Language Arts.

In Model 3, the predictor percentage of no high school diploma (% no high school) decreases in power from a beta of -.297 to -.173. It is not statistically significant, $p < .072$. The beta for percentage of female-only households (% female parent) increased from a beta of -.203 to -.213. This is statistically significant at the $p < .007$ level, $t = -2.723$ and contributes 4.5% of the explained variance to the overall model. The predictor variable population with a bachelor's degree was added to the model and reports a beta = .201. It is statistically significant at the $p < .026$ level, $t = 2.251$ and contributes 4% of the explained variance to the overall model. The beta is positive, which means as the percentage of bachelor's degree increases, 2010 ITED 11th grade Language Arts scores increase.

With the addition of predictors in Models 2 and 3, the percentage of population with no high school diploma (% no high school) decreases in power. In Model 3, however, the strength of the percentage of population with female-only households (% female-only parent) increases.

The VIF for all predictors in all three models fell below the threshold of 2.00 and all tolerance levels were greater than .2 (Field, 2009, 2013), suggesting that the models do not have problems with multicollinearity.

Table 18

Standardized Coefficient Betas and Tolerance for Stepwise Multiple Regression Model for 2010 11th Grade Language Arts Scores

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	85.504	1.220		70.099	.000					
	% no high school	-1.057	.207	-.377	-5.098	.000	-.377	-.377	-.377	1.000	1.000
2	(Constant)	89.341	1.914		46.678	.000					
	% no high school	-.832	.222	-.297	-3.752	.000	-.377	-.288	-.273	.844	1.185
	% female only parent	-.922	.358	-.203	-2.572	.011	-.320	-.202	-.187	.844	1.185
3	(Constant)	84.170	2.975		28.294	.000					
	% no high school	-.485	.268	-.173	-1.811	.072	-.377	-.144	-.130	.564	1.772
	% female only parent	-.965	.354	-.213	-2.723	.007	-.320	-.214	-.195	.842	1.188
	% bachelor's degree	.220	.098	.201	2.251	.026	.346	.178	.161	.643	1.555

a. Dependent Variable: % 11th Grade LA Proficiency

Results of Stepwise Multiple Regression of Dependent Variable: Mathematics

After examining the Pearson Correlation Coefficient for each variable and determining the significance of each relationship, a stepwise linear multiple regression analysis of the predictor variables and dependent variable was conducted. The models were assessed at the .05 level of significance, which is most commonly used in social science research for significance with an alpha of .05, where $p < .05$ (Gay, Mills, & Airasian, 2012).

Interpretation of Stepwise Multiple Regression Model Summary for 2010 ITED 11th Grade Mathematics Scores

The stepwise multiple regression estimates the impact of six models (see Table 20) on 2010 ITED 11th grade Mathematics scores. For Model 1, the predictor percentage of population with no high school diploma (% no high school) reports an *R* Square of .124 and explains 12.4% of the variance in the dependent variable, 11th grade Mathematics proficiency. In Model 2, when the predictor percentage of female-only households (% female-only parent) is added, an *R* Square of .174 is reported. Therefore, Model 2 demonstrates the combination of predictor percentage of no high school diploma (% no high school) and predictor percentage of female-only households (% female-only parent) explains 17.4% of the variance in the dependent variable, 11th grade Mathematics proficiency. The *R* Square change from Model 1 to Model 2 was .050, which indicated that 5% of the variance is added by the percentage of female-only households (% female-only parent). The *R* Square change was statistically significant $F(1,156) = 9.466$, $p < .002$.

In Model 3, when the predictor percentage of median income (median income) is added, an *R* Square of .207 is reported. Therefore, Model 3 demonstrates that the combination of predictors percentage of no high school diploma (% no high school), percentage of female-only households (% female-only parent), and percentage of median income (median income) explains 20.7% of the variance in the dependent variable, 11th grade Mathematics proficiency. The *R* Square change from Model 2 to Model 3 was .032, which reveals that 3.2% of the variance is now added by median income. Model 3 was statistically significant $F(1,155) = 6.316$, $p < .013$.

In Model 4, when the predictor percentage of no high school diploma (% no high school) was dropped from the model, the variable did not remain statistically significant. Therefore, Model 4 demonstrates the combination of predictors percentage of female-only households (% female-only parent) and median income (median income) explains

19.3% of the variance in the dependent variable, 11th grade Mathematics proficiency. The *R* Square change from Model 3 to Model 4 was -0.14, which reveals the combination of variables yielded -1.4% of the variance as a result of adding median income (median income) and the dropping of percentage of no high school diploma (% no high school). Model 4 was not statistically significant.

In Model 5, when the predictor percentage of population making less than $25,000 (% less $25K) a year is added, an *R* Square of .216 is reported. Therefore, Model 5 demonstrates the combination of predictors percentage of no high school diploma (% no high school), percentage of female-only households (% female-only parent), percentage of median income (median income), and percentage of population making less than $25,000 (% less $25K) a year explains 21.6% of the variance in the dependent variable, 11th grade Mathematics proficiency. The *R* Square change from Model 4 to Model 5 was .023, which shows that 2.3% of the variance was now added by percentage of population making less than $25,000 a year (% less $25K). The *R* Square change was statistically significant $F(1, 155) = 7.01564$, $p < .034$.

In Model 6, when the predictor percentage of no high school diploma (% no high school) is added, an *R* Square of .236 is reported. Therefore, Model 6 demonstrates that the combination of predictors percentage of female-only household (% female-only parent), median income (median income), percentage of those making less than $25,000 a year (% less $25K), and percentage of no high school diploma (% no high school) explains 23.6% of the variance in the dependent variable, 11th grade Mathematics proficiency. The *R* Square change from Model 5 to Model 6 was .020, which reveals that

2% of the variance was now added by percentage of no high school diploma (% no high school). The *R* Square change was statistically significant $F(1,154) = 3.982$, $p < .048$.

Table 19

Stepwise Multiple Regression Model Summary for 2010 ITED 11th Grade Mathematics Scores

Model Summary[g]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.353[a]	.124	.119	7.36611	.124	22.298	1	157	.000	
2	.418[b]	.174	.164	7.17520	.050	9.466	1	156	.002	
3	.455[c]	.207	.191	7.05598	.032	6.316	1	155	.013	
4	.439[d]	.193	.182	7.09510	-.014	2.734	1	155	.100	
5	.465[e]	.216	.201	7.01564	.023	4.553	1	155	.034	
6	.485[f]	.236	.216	6.94911	.020	3.982	1	154	.048	1.891

a. Predictors: (Constant), % no high school

b. Predictors: (Constant), % no high school, % female only parent

c. Predictors: (Constant), % no high school, % female only parent, Median income

d. Predictors: (Constant), % female only parent, Median income

e. Predictors: (Constant), % female only parent, Median income, % less $25k

f. Predictors: (Constant), % female only parent, Median income, % less $25k, % no high school

g. Dependent Variable: % 11th Grade Math Proficiency

The stepwise multiple regression model for 2010 ITED 11th grade Mathematics scores met the assumption that the residuals are normally distributed and uncorrelated with the predictors as evidenced by a Durbin-Watson statistic of 1.891. A Durbin-Watson value between 1 and 4 indicates that this assumption for multiple regression was met (Field, 2009).

Table 21 displays the results of the ANOVA for this hierarchical regression model. The ANOVA estimates the impact of six separate models on the dependent variable. The ANOVA demonstrates all six models are statistically significant.

Model 1 is significant at the .000 level, $F = 22.298$, $df = 1{,}158$.

Model 2 is significant at the .000 level, $F = 16.483$, $df = 1, 158$.

Model 3 is significant at the .000 level, $F = 3.469$, $df = 1, 158$.

Model 4 is significant at the .000 level, *F* = 18.629, *df* = 1,158.

Model 5 is significant at the .000 level, *F* = 14.220, *df* = 1, 158.

Model 6 is significant at the .000 level, *F* = 11.866, *df* = 1, 158.

Table 20

ANOVA for Stepwise Multiple Regression Model for 2010 ITED 11th Grade Mathematics Scores

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1209.905	1	1209.905	22.298	.000[b]
	Residual	8518.757	157	54.260		
	Total	9728.662	158			
2	Regression	1697.230	2	848.615	16.483	.000[c]
	Residual	8031.432	156	51.484		
	Total	9728.662	158			
3	Regression	2011.697	3	670.566	13.469	.000[d]
	Residual	7716.964	155	49.787		
	Total	9728.662	158			
4	Regression	1875.562	2	937.781	18.629	.000[e]
	Residual	7853.100	156	50.340		
	Total	9728.662	158			
5	Regression	2099.675	3	699.892	14.220	.000[f]
	Residual	7628.986	155	49.219		
	Total	9728.662	158			
6	Regression	2291.985	4	572.996	11.866	.000[g]
	Residual	7436.677	154	48.290		
	Total	9728.662	158			

a. Dependent Variable: % 11th Grade Math Proficiency

b. Predictors: (Constant), % no high school

c. Predictors: (Constant), % no high school, % female only parent

d. Predictors: (Constant), % no high school, % female only parent, Median income

e. Predictors: (Constant), % female only parent, Median income

f. Predictors: (Constant), % female only parent, Median income, % less $25k

g. Predictors: (Constant), % female only parent, Median income, % less $25k, % no high school

The coefficient table demonstrates how each predictor influences the dependent variable, % 11th grade Mathematics proficiency (see Table 22). In Model 1, the predictor percentage of population with no high school diploma (% no high school) reports a beta = -.353. It is statistically significant at the .000 level, *t* = -4.722 and contributes 12.4% of the explained variance to the model. The beta is negative, which means as the percentage of population with no high school diploma (% no high school) increases, 2010 ITED 11th grade Mathematics scores decrease.

In Model 2, the predictor percentage no high school diploma (% no high school) decreases in power from a beta of -.353 to -.256 when the variable percentage of population with female-only households (% female-only parent) is entered. It is statistically significant at the .002 level, $t = -3.077$ and now contributes 6.5% of the explained variance to the outcome variable. The predictor variable added in Model 2, population with female-only households (% female-only parent) reports a beta -.244. It is statistically significant at the .002 level, $t = -3.077$. The beta is negative, which means as the percentage female-only household (% female-only parent) increases, 2010 ITED 11th grade Mathematics scores decrease.

In Model 3, the predictor percentage of population of no high school diplomas (% no high school) decreases in power from a beta -.256 to -.147. It is not statistically significant at the $p < .100$ level. The percentage female-only household (% female-only parent) slightly increases in power from a beta -.244 to -.245. It is statistically significant at the $p = .002$ level, t = -3.144 and contributes 6% of the explained variance in the overall model. The percentage median income (median income), reports a beta of .210. It is statistically significant at the $p < .013$ level, $t = 2.513$ and contributes 4.4% explained variance to the overall model. The beta is positive, which means as the median income increases, 2010 ITED 11th grade Mathematics scores increase.

In Model 4, the predictor percentage female-only household (% female-only parent) increases in power from a beta of -.245 to -.290. It is statistically significant at the $p < .000$ level, $t = -3.944$ and contributes 8.4% of the explained variance in the overall model. The predictor percentage median income (median income) reports a beta of .277. It is statistically significant at the $p < .000$ level, $t = 3.778$ and contributes 7.6% of the explained variance to the overall model. The beta is positive, which means as the median income increases, 2010 ITED 11th grade Mathematics scores increase.

In Model 5, the predictor percentage female-only household (% female-only parent) increases in power from a beta of -.290 to -.312. It is statistically significant at the $p < .000$ level, $t = -4.258$ and contributes 9.7% of the explained variance in the overall model. The predictor median income (median income) increases in power from a beta of .277 to .414. It is statistically significant at the $p = .000$ level, $t = 4.277$ and contributes 17.1% of the explained variance to the overall model. The predictor percentage population making less than $25,000 a year (% less $ 25K), reports a beta = .208. It is statistically significant at the $p < .034$ level, $t = 2.134$ and contributes 4.3% of the explained variance to the overall model. The beta is positive, which means as the percentage of families making less than $25,000 a year increases, 2010 ITED 11th grade Mathematics scores increase.

In Model 6, the predictor percentage no high school diploma (% no high school), reports a beta = -.177. It is statistically significant at the $p < .048$ level, $t = -1.996$ and contributes 3.1% of the variance explained in the overall model. The beta is negative, which means as the percentage of no high school diploma increases, 2010 ITED 11th grade Mathematics scores decrease. With the addition of predictors in Models 2 and 3, the percentage of population with no high school diploma (% no high school) decreases in power. In Model 3, both no high school diploma (% no high school) and female-only households (% female-only parent) decrease in power with the addition of the variable median income.

In Model 6, once median income (median income) was added, percentage of no high school diploma (% no high school) no longer became statistically significant. With the addition of predictors in Model 5, the percentage of female-only households (% female-only parent) slightly increases in power while median income (median income) sees no change. In Model 6, percentage of no high school diploma (% no high school) is re-added. As a result, percentage of female-only households (% female-only parent) decreases in power. Median income (median income) remains unchanged, and percentage of households making less than $25,000 a year (% less $25K) increases in power.

The VIF for all predictors in all the models fell below the threshold of 2.00 with the exception of median income in Model 6. However, the discrepancy was small (.051). Additionally, since all tolerance levels were greater than .2 (Field, 2009, 2013) including median income (.488), it was assumed that the models do not have problems with multicollinearity.

Table 21

Standardized Coefficient Betas and Tolerance for Stepwise Multiple Regression Model for 2010 ITED 11th Grade Mathematics Scores

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	85.570	1.333		64.201	.000					
	% no high school	-1.070	.227	-.353	-4.722	.000	-.353	-.353	-.353	1.000	1.000
2	(Constant)	90.544	2.073		43.670	.000					
	% no high school	-.778	.240	-.256	-3.239	.001	-.353	-.251	-.236	.844	1.185
	% female only parent	-1.194	.388	-.244	-3.077	.002	-.345	-.239	-.224	.844	1.185
3	(Constant)	81.588	4.105		19.873	.000					
	% no high school	-.447	.270	-.147	-1.654	.100	-.353	-.132	-.118	.644	1.553
	% female only parent	-1.200	.382	-.245	-3.144	.002	-.345	-.245	-.225	.844	1.185
	Median income	.000	.000	.210	2.513	.013	.335	.198	.180	.733	1.365
4	(Constant)	78.104	3.543		22.046	.000					
	% female only parent	-1.420	.360	-.290	-3.944	.000	-.345	-.301	-.284	.960	1.041
	Median income	.000	.000	.277	3.778	.000	.335	.290	.272	.960	1.041
5	(Constant)	69.742	5.256		13.269	.000					
	% female only parent	-1.532	.360	-.312	-4.258	.000	-.345	-.324	-.303	.940	1.064
	Median income	.000	.000	.414	4.277	.000	.335	.325	.304	.541	1.850
	% less $25k	.388	.182	.208	2.134	.034	-.147	.169	.152	.530	1.885
6	(Constant)	72.844	5.433		13.407	.000					
	% no high school	-.537	.269	-.177	-1.996	.048	-.353	-.159	-.141	.632	1.583
	% female only parent	-1.283	.378	-.262	-3.398	.001	-.345	-.264	-.239	.837	1.195
	Median income	.000	.000	.351	3.475	.001	.335	.270	.245	.488	2.051
	% less $25k	.439	.182	.235	2.409	.017	-.147	.191	.170	.520	1.922

a. Dependent Variable: % 11th Grade Math Proficiency

The stepwise regression represented in Tables 20 through 22 identified median income as a significant variable at $p < .013$ level. However, the variable produced an unstandardized beta of .000 in Models 3 through 6. This can be explained by scaling differences between the median income and SPSS rounding (i.e., rounding to the thousandths place, .000). Because the Median Income is so large (i.e., the mean is 52,000) and the model is trying to predict such a small dependent variable, in this case % 11th grade Mathematics proficiency, for every dollar increase in income there is a very small incremental change in the dependent variable. The unstandardized beta is .000, because the incremental increase of one dollar is too small for SPSS to handle due to its rounding rule. Therefore, it is much more useful to examine the standardized beta.

However, the problem is that the predictive formula (Maylone, 2002) relies on the unstandardized beta. When median income was included in the predictive model, the results were spurious in comparison to the predictive power of 3rd grade Language Arts and Mathematics and 11th grade Language Arts. Additionally, the low tolerance value for median income suggested possible multicollinearity with another variable in the model, most likely % less 25K, since the correlation coefficient between these two variables was exceedingly large. Consequently, in order to address these two issues a new stepwise regression model was run that manually excluded the median income variable. The results and interpretation for this stepwise regression model begins with Table 23.

Table 22

Stepwise Multiple Regression Model Summary for 2010 ITED 11th Grade Mathematics Scores without Median Income

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.353[a]	.124	.119	7.36611	.124	22.298	1	157	.000
2	.418[b]	.174	.164	7.17520	.050	9.466	1	156	.002

a. Predictors: (Constant), % no high school

b. Predictors: (Constant), % no high school, % female only parent

The stepwise multiple regression model for 2010 ITED 11th grade Mathematics scores met the assumption that the residuals are normally distributed and uncorrelated with the predictors as evidenced by a Durbin-Watson statistic of 1.891. A Durbin-Watson value between 1 and 4 indicates that this assumption for multiple regression was met (Field, 2009).

Table 24 displays the results of the ANOVA for this hierarchical regression model. The ANOVA estimates the impact of two separate models on the dependent variable. The ANOVA demonstrates both models are statistically significant.

Model 1 is significant at the .000 level, $F = 22.298$, $df = 1,158$.

Model 2 is significant at the .000 level, $F = 16.483$, $df = 1, 158$

Table 23

ANOVA for Stepwise Multiple Regression Model for 2010 ITED 11th Grade Mathematics Scores without Median Income

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1209.905	1	1209.905	22.298	.000[b]
	Residual	8518.757	157	54.260		
	Total	9728.662	158			
2	Regression	1697.230	2	848.615	16.483	.000[c]
	Residual	8031.432	156	51.484		
	Total	9728.662	158			

a. Dependent Variable: % 11th Grade Math Proficiency

b. Predictors: (Constant), % no high school

c. Predictors: (Constant), % no high school, % female only parent

The coefficient table demonstrates how each predictor influences the dependent variable, % 11th grade Mathematics (see Table 25). In Model 1, the predictor percentage of population with no high school diploma (% no high school) reports a beta = -.353. It is statistically significant at the .000 level, $t = -4.722$ and contributes 12.4% of the explained variance to the model. The beta is negative, which means as the percentage of population with no high school diploma (% no high school) increases, 2010 ITED 11th grade Mathematics scores decrease.

In Model 2, the predictor percentage of population with no high school diploma (% no high school) decreases in power from a beta of -.353 to -.256 when the variable percentage of population with female-only households (% female-only parent) is entered. It is statistically significant at the .001 level, $t = -3.239$ and now contributes 6.5% of the explained variance to the outcome variable. The predictor variable added in Model 2, percentage of population with female-only households (% female-only parent), reports a beta of -.244. It is statistically significant at the .002 level, *t* = -3.077 and contributes 5.9% of the explained variance to the overall model. The beta is negative, which means as the percentage of population with female-only households increases, 2010 ITED 11th grade Mathematics scores decrease.

The VIF for all predictors in all the models fell below the threshold of 2.00 Additionally, all tolerance levels were greater than .2 (Field, 2009, 2013), including median income (.488), indicating the models do not have issues with multicollinearity.

Table 24

Standardized Coefficient Betas and Tolerance for Stepwise Multiple Regression Model for 2010 ITED 11th Grade Mathematics Scores without Median Income

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	85.570	1.333		64.201	.000					
	% no high school	-1.070	.227	-.353	-4.722	.000	-.353	-.353	-.353	1.000	1.000
2	(Constant)	90.544	2.073		43.670	.000					
	% no high school	-.778	.240	-.256	-3.239	.001	-.353	-.251	-.236	.844	1.185
	% female only parent	-1.194	.388	-.244	-3.077	.002	-.345	-.239	-.224	.844	1.185

a. Dependent Variable: % 11th Grade Math Proficiency

Examples of Predictive Power for Dependent Variable: Language Arts

In total, two statistically significant models for both 3rd and 11th grade ITBS/ITED Language Arts scores were identified through multiple stepwise regressions with different combinations of predictors to explain the variance in the dependent variable. Maylone (2002) found the numerical coefficients for three SES factors that predicted 56% of the variance in his sample:

1. Percentage of students eligible for free or reduced-price lunches

2. Percentage of district lone-parent households
3. Mean annual district household income

These values were combined with the SPSS-generated numerical constant to create the following predictor equation:

$$-0.226a + -0.767b + 0.00014c + 64.533 =$$

a = Percentage of students eligible for free or reduced-price lunches

b = Percentage of district lone-parent households

c = Mean annual district household income

For the purpose of this study, a similar algorithm was created for each of the models identified through the stepwise regression method. This algorithm was then applied to 100% of the population in a new column labeled Predictive Model with the model number. To determine which model falls within the standard error of estimate (SEE), the unstandardized betas and constant for each model were entered into the following formula (Maylone, 2002).

$$A_i (X_i) + A_{ii} (X_{ii}) + A_{iii} (X_{iii}) \ldots + \text{Constant} = Y$$

A_i = individual school district predictor value

X_i = unstandardized beta for predictor

Y = predicted Language Arts score

A predicted score was calculated from each of the four models for the entire sample. These scores were then entered into the database for the dependent variable and the margin of error was calculated by subtracting the predicted score from the actual score for the entire sample. Next, the standard deviation for each distribution of margin of error was concluded to have the greatest predictive power in accordance with the standard error of estimate (SEE).

Example 1: Ames Community Schools District, 3rd Grade Language Arts

For the Ames CSD, the values for the three community demographic factors (% no high school, % female-only parent, % families with children) are as follows:

a =	% no high school	=	2.0
b =	% female-only household	=	3.4
c =	% families with children	=	20.8

The values were entered into the following equation:

$$=(2.0*-0.693)+(3.4*-1.719)+(20.8*0.274)+83.233 = 81.7016$$

The result, 81.7016, represents the predicted 2010 3rd grade ITBS Language Arts scores for Ames Community School District. It suggests 81.7016% of Grade 3 students enrolled at Ames Community School District were predicted to score either proficient or advanced proficient. The actual percentage of Grade 3 students that scored either proficient or advanced proficient in 2010 ITBS Language Arts equaled 85.56%. The standard error of estimate for the predictive model, Model 3, was 8.191. If the residual fell within 8.191 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 85.56 – 81.7016 = 3.8584. Since the residual (2.2026) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model (see Appendix B).

Example 2: Clinton Community Schools District, 3rd Grade Language Arts

For the Clinton CSD, the values for the three community demographic factors (% no high school, % female-only parent, % families with children) are as follows:

a = % no high school = 8.1

b = % female-only household = 7.6

c = % families with children = 26.5

The values were entered into the following equation:

=(8.1*-0.693)+(7.6*-1.719)+(26.5*0.274)+83.233 = 71.8163

The result, 71.8163, represents the predicted 2010 3rd grade ITBS Language Arts scores for the Clinton Community School District. It suggests 71.8163% of 3rd grade students enrolled at the Clinton Community School District were predicted to score either proficient or advanced proficient. The actual percentage of 3rd grade students that scored either proficient or advanced proficient in 2010 ITBS Language Arts equaled 69%. The standard error of estimate for the predictive model, Model 3, was 8.191. If the residual fell within 8.191 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 69.00 – 71.8163 = -2.8163. Since the residual (-2.8163) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model (see Appendix B).

Example 3: Madrid Community Schools District, 11th Grade Language Arts

For the Madrid CSD, the values for the three community demographic factors (% no high school, % female only parent, % families with children) are as follows:

a = % female-only household = 5.2

b = % no high school = 5.6

c = % 25 or over with BA degree = 13.4

The values were entered into the following equation:

$$=(5.2*-0.485)+(5.6*-0.965)+(13.4*0.22)+84.17 = 79.384$$

The result, 79.384, represents the predicted 2010 11th grade ITED Language Arts score for the Madrid Community School District. It suggests 79.384% of 11th grade students enrolled at the Madrid Community School District were predicted to score either proficient or advanced proficient. The actual percentage of 11th grade students that scored either proficient or advanced proficient in 2010 ITED Language Arts equaled 79.59%. The standard error of estimate for the predictive model, Model 3, was 6.53899. If the residual fell within 6.53899 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 79.95 – 79.384 = 0.206. Since the residual (0.206) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model (see Appendix D).

Example 4: West Des Moines Community Schools District, 11th Grade Language Arts

For the West DSM CSD, the values for the three community demographic factors (% no high school, % female only parent, % families with children) are as follows:

a = % female-only household = 5.7

b = % no high school diploma = 2.6

c = % 25 or over with BA degree = 35.8

The values were entered into the following equation:

$$=(2.6*-0.965)+(5.7*-0.485)+(29.3*0.22)+84.17 = 85.2845$$

The result, 85.2845, represents the predicted 2010 11th grade ITBS Language Arts scores for the West DSM Community School District. It suggests 85.2845% of 11th grade students enrolled at West DSM Community School District were predicted to score either proficient or advanced proficient. The actual percentage of 11th grade students that scored either proficient or advanced proficient in 2010 ITED Language Arts equaled 87.44%. The standard error of estimate for the predictive model, Model 3, was 6.53899. If the residual fell within 6.53899 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 87.44 – 85.2845= 2.1555. Since the residual (2.1555) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model. The standard error of estimate for the predicted score was calculated by subtracting the actual score from the predicted score, for example 79.08 – 81.8635 = -2.7835 (see Appendix D).

Examples of Predictive Power for Dependent Variable: Mathematics

In total, two statistically significant models for both 3rd and 11th Grade ITBS/ITED Mathematics scores were identified through multiple stepwise regressions with different combinations of predictors to explain the variance in the dependent variable. To determine which model produced the strongest predictive power, the unstandardized betas and constant for each model were entered into the following formula (Maylone, 2002).

$$A_i (X_i) + A_{ii} (X_{ii}) + A_{iii} (X_{iii}) \ldots + \text{Constant} = Y$$

A_i = individual school district predictor value

X_i = unstandardized beta for predictor

Y = predicted Language Arts score

A predicted score was calculated for each of the two models for the entire sample. These scores were then entered into the database for the dependent variable and then the margin of error was calculated by subtracting the predicted score from the actual score for the entire sample. Next, the standard deviation for each distribution of margin of error was concluded to have the greatest predictive power in accordance with the standard error of estimate (SEE).

Example 1: Ames Community Schools District, 3rd Grade Mathematics

For the Ames CSD, the values for the two community demographic factors (% female-only parent, % single parent household) are as follows:

a = % female-only household = 3.4

b = % single household = 4.7

The values were entered into the following equation:

$$=(3.4*-0.687)+(4.7*-1.005)+90.772 = 84.6745$$

The result, 84.6745, represents the predicted 2010 3rd Grade ITBS Mathematics scores for Ames Community School District. It suggests 84.6745% of Grade 3 students enrolled at Ames Community School District were predicted to score either proficient or advanced proficient. The actual percentage of Grade 3 students that scored either proficient or advanced proficient in 2010 ITBS Mathematics equaled 86.67%. The standard error of estimate for the predictive model, Model 3, was 8.99045. If the residual fell within 8.99045 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 84.6745 – 86.67= 1.9955. Since the residual (1.9955) did not exceed the absolute value of the SEE it was determined that the percentage of passing scores for the district was successfully predicted by the model (see Appendix C).

Example 2: Clinton Community Schools District, 3rd Grade Mathematics

For the Clinton CSD, the values for the two community demographic factors (% female-only parent, % single parent household) are as follows:

a =	% no high school diploma	=	8.1
b =	% single parent household	=	10.9

The values were entered into the following equation:

=(8.1*-1.005)+(10.9*-0.687)+90.772 = 74.2528

The result, 74.2528, represents the predicted 2010 3rd Grade ITBS Mathematics scores for the Clinton Community School District. It suggests 74.2528% of Grade 3 students enrolled at Clinton Community School District were predicted to score either proficient or advanced proficient. The actual percentage of 2010 Grade 3 ITBS Mathematics that scored either proficient or advanced proficient equaled 79.18%. The standard error of estimate for the predictive model, Model 2, was 8.99045. If the residual fell within 8.99045 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 79.18-74.2528= 4.9272. Since the residual (4.9272) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model (see Appendix C).

Example 3: Madrid Community Schools District, 11th Grade Mathematics

For the Madrid CSD, the values for the two community demographic factors (% no high school diploma, % female-only parent) are as follows:

a = % no high school diploma = 5.6

b = % female-only parent = 5.2

The values were entered into the following equation:

(5.6 *-.778)+(5.2*-1.194)+90.544 = 79.9784

The result, 79.9784, represents the predicted 2010 11th Grade ITED Mathematics scores for the Madrid Community School District. It suggests 79.9784% of Grade 11 students enrolled at Madrid Community School District were predicted to score either proficient or advanced proficient. The actual percentage of Grade 11 students that scored either proficient or advanced proficient in 2010 ITED Mathematics equaled 79.59%. The standard error of estimate for the predictive model, Model 2, was 7.17520. If the residual fell within 7.17520 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 79.59 – 79.9784= -0.3884. Since the residual (-0.3884) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model (see Appendix E).

Example 4: West Des Moines Community Schools District, 11th Grade Mathematics

For the West DSM CSD, the values for the four community demographic factors (% no high school diploma, % female-only parent) are as follows:

a = % no high school diploma = 5.7

b = % female-only household = 2.6

The values were entered into the following equation:

(2.6*-1.194)+(5.7*-0.778)+90.544=81.7154

The result, 81.7154, represents the predicted 2010 11th Grade ITED Mathematics scores for West DSM Community School District. It suggests 81.7154% of Grade 11 students enrolled at West DSM Community School District were predicted to score either proficient or advanced proficient. The actual percentage of Grade 11 students that scored either proficient or advanced proficient in 2010 ITED Mathematics equaled 83.93%. The standard error of estimate for the predictive model, Model 2, was 7.17520. If the residual fell within 7.17520 percentage points, it could be determined that district performance was successfully predicted. The residual was calculated by subtracting the actual score from the predicted score, 83.93 – 81.7154= 2.2146. Since the residual (2.2146) did not exceed the absolute value of the SEE, it was determined that the percentage of passing scores for the district was successfully predicted by the model.

The eight examples discussed above represent a small sampling taken from the overall school district analyses where the appropriate grade level and subject algorithm was employed to predict school district performance. Please see Appendices B through E for the appropriate Excel analyses output.

Summary of the Results

Research Questions and Answers for Dependent Variables 3rd and 11th Grade ITBS/ITED in Language Arts and Mathematics

This study began by examining two main research questions:

1. How much variance in ITBS 3 and ITED 11 2010 test results in Language Arts and Mathematics is explained by community demographic factors?
2. How accurately can community demographic factors predict a school district's percentage of students scoring proficient or above on the 2010 ITBS 3 and ITED 11 Language Arts and Mathematics sections?

To better understand this research, current and past literature and the results of the research questions were thoroughly reviewed and answered.

Research Question 1

How much variance in ITBS 3 and ITED 11 2010 test results in Language Arts and Mathematics is explained by community demographic factors?

Results

As mentioned in Chapter III, stepwise multiple regression is a statistical technique that allows for the simultaneous analysis of several independent variables in relation to a dependent variable. In this study, community demographic factors served as the independent variables (15 community demographic factors) and ITBS 3 and ITED 11 2010 assessment results in Language Arts and Mathematics served as the dependent variables. In order to determine how much variance in ITBS 3 and ITED 11 2010 test results in Language Arts and Mathematics can be explained by community demographic factors, stepwise multiple regression analyses were performed.

3rd Grade ITBS Language Arts Scores

The stepwise multiple regression estimated the impact of three models on 2010 ITBS Language Arts scores. The combination of percentage no high school diploma (% no high school), percentage female-only households (% female-only parent), and percentage two-parent families with children (% families with children) accounted for 20.4% of the explained variance to the overall model. The predictor variable percentage no high school diploma (% no high school diploma) had the weakest influence of the three predictor variables in Model 3. Percentage of female-only households (% female-only parent) was the strongest predictor of the 2010 ITBS 3rd grade Language Arts scores.

3rd Grade ITBS Mathematics Scores

The stepwise multiple regression estimated the impact of two models on 2010 ITBS Mathematics scores. The combination of percentage lone-parent household (% single parent) and percentage no high school diploma (% no high school) accounted for 12.2% of the explained variance to the overall model. The predictor percentage no high school diploma (% no high school) had the weakest influence of the two predictor variables in Model 2. The predictor variable percentage lone-parent household (% single parent) was the strongest predictor of the 2010 ITBS 3rd grade Mathematics scores.

11th Grade ITED Language Arts Scores

The stepwise multiple regression estimated the impact of three models on 2010 ITED 11th grade Language Arts scores. The combination of percentage no high school diploma (% no high school), percentage female-only parent (% female-only parent), and percentage of households with bachelor's degree (% bachelor's degree) accounted for 20.3% of the explained variance to the overall model. The predictor percentage of households with bachelor's degree (% bachelor's degree) had the weakest influence of the three predictor variables in Model 3. The predictor variable percentage female-only parent (% female-only parent) was the strongest predictor of the 2010 ITED 11th grade Language Arts scores.

11th Grade ITED Mathematics Scores

The stepwise multiple regression estimated the impact of six models on 2010 ITED 11th grade Mathematics scores. The combination of percentage no high school diploma (% no high school), percentage female-only parent (% female-only parent), median income (median income), and percentage of households making less than $25,000 a year (% less $25K) accounted for 23.6% of the explained variance to the overall model. The predictor percentage households making less than $25,000 a year (% less $25K) had the weakest influence of the four predictor variables in Model 6. The predictor variable percentage female-only parent (% female-only parent) was the strongest predictor of the 2010 ITED 11th grade Mathematics scores.

Research Question 2

How accurately can community demographic factors predict a school district's percentage of students scoring proficient or above on the 2010 ITBS 3 and ITED 11 Language Arts and Mathematics sections?

Results

The goal of the stepwise multiple regression testing was to produce an equation composed of several variables, a representation of community demographic factors, the accompanying coefficients, and a numerical constant, the sum of which would provide a reasonably accurate prediction of Iowa school district's 2010 ITBS 3 and ITED 11 Language Arts and Mathematics scores. Using the SPSS statistical computer program, 15 community demographic factors were combined, with the goal of finding the combination of factors that explained the greatest amount of variance in the dependent variables, ITBS 3 and ITED 11 Language Arts and Mathematics scores. The betas and constant from the stepwise regressions were applied to the formula created by Maylone (2002) and added to the database for each dependent variable. The formulas created a predicted score for each school district. The actual score was then subtracted from the predicted score and the total labeled as the difference. The difference was calculated for each dependent variable for each school district. The predictive formula that generated the smallest standard deviation was considered to be the strongest predictive model for each dependent variable.

3rd Grade ITBS Language Arts Scores

The stepwise multiple regression for 3rd grade ITBS Language Arts scores identified three statistically significant independent variables: percentage no high school diploma (% no high school), percentage female-only parent (% female-only parent), and percentage two-parent families with children (% families with children). When the unstandardized betas and constants for each of these variables were plugged into the predictive formula for each school district, the model successfully predicted 70% of the district's 2010 3rd grade ITBS Language Arts scores (see Appendix B).

3rd Grade ITBS Mathematics Scores

The stepwise multiple regression for 3rd grade ITBS Mathematics scores identified two statistically significant independent variables: percentage lone-parent household (% single parent) and percentage no high school diploma (% no high school). When the unstandardized betas and constants for each of these variables were plugged into the predictive formula for each school district, the model successfully predicted 71% of the district's 2010 3rd grade ITBS Mathematics scores (see Appendix C).

11th Grade ITED Language Arts Scores

The stepwise multiple regression for 11th grade ITED Language Arts scores identified three statistically significant independent variables: percentage no high school diploma (% no high school), percentage female-only parent (% female-only parent), and percentage households with a bachelor's degree (% bachelor's degree). When the unstandardized betas and constants for each of these variables were plugged into the predictive formula for each school district, the model successfully predicted 73% of the district's 2010 11th grade ITED Language Arts scores (see Appendix D).

11th Grade ITED Mathematics Scores

The stepwise multiple regression for 11th grade ITED Mathematics scores identified four statistically significant independent variables: percentage no high school diploma (% no high school), percentage female-only parent (% female-only parent), median income (median income), and percentage households making less than $25,000 a year (% less $25K). When the unstandardized betas and constants for each of these variables were plugged into the predictive formula for each school district, the model successfully predicted 69% of the district's 2010 11th grade ITED Mathematics scores (see Appendix E).

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

In this chapter, I discuss the findings, determine conclusions, and provide recommendations for education policy, practice, and future study. In Chapter I, I identified federal and state efforts to increase district- and school-level accountability, many of which fail to recognize the powerful influence of community demographic factors (Maylone 2002, Jones, 2009, Turnamian, 2012, Tienken & Orhlich, 2013). The purpose of this study was to determine which combination of 15 community demographic factors account for the greatest amount of variance and can best predict an Iowa school district's percentage of students scoring proficient or above on the 2010 Iowa Test of Basic Skills (ITBS) and Iowa Test of Educational Development (ITED) for 3rd and 11th grade Language Arts and Mathematics. This study, along with extant literature and past research, supports the hypothesis that community demographic factors have an impact on state standardized test scores.

The results of this study demonstrate that certain community demographic factors impact how students perform on state standardized assessments. This study focused on community demographic factors and their relationship to student achievement as defined by state standardized assessments. This study applied simultaneous multiple regression analyses to produce research-driven evidence to inform education policy-makers and school district leadership further interpretation of 2010 ITBS 3rd grade and ITED 11th grade Language Arts and Mathematics scores.

After an extensive review of the research, empirical evidence exists to support the premise of examining various community demographic factors as a means of predicting how students in any given state perform on their standardized assessments (Maylone, 2002; Jones, 2008; Turnamian, 2012; Tienken & Orlich, 2013). The two research questions that drove this study were:

1. How much variance in ITBS 3 and ITED 11 2010 test results in Language Arts and Mathematics is explained by community demographic factors?
2. Which community demographic factors account for the greatest amount of variance in a school district's percentage of students passing the 2010 ITBS 3 and ITED 11?

This study aligns with and replicates the works of Maylone (2002), and Turnamian (2012). Maylone (2002) was able to explain 56% of the variance in the Michigan state test scores by examining three out-of-school variables: percentage of students eligible for free or reduced-price lunches, percentage of district lone-parent households, and mean district annual household income (p. 99). Utilizing these three out-of-school variables, Maylone (2002) was also able to predict 74% of the Michigan Educational Assessment Program (MEAP) test scores. "The results . . . also reflect the findings of an Educational Research Service study that showed that poverty alone accounted for 56% of the variance among state average test scores in the NAEP-92 Trial State Assessment in mathematics. The same study showed that a stunning 89% of those variations were due to poverty and just three community demographic variables (number of parents living in the home, parents' education, and community type)" (Education Research Service, 1994; Maylone, 2002).

In Turnamian's (2012) study, community demographic variables (% bachelor's degree, % lone parent, % advanced degree, % families below poverty, and % economically disadvantaged) were able to account for 58% of the variance in the 2009 New Jersey Assessment of Skills and Knowledge (NJ ASK) Language Arts scores. In the same study, Turnamian (2012) was also able to predict 43% of the variance in the New Jersey Assessment of Skills and Knowledge (NJ ASK 3) Mathematics scores by looking at community demographic variables % less than $30,000 annual income, % with a high school diploma and some college, % with no high school diploma, and % with a high school diploma. Turnamian (2012) also utilized the following community demographic variables: % of lone-parent households, % of economically disadvantaged families, and % of households with a bachelor's degree to predict 52% of the 2009 New Jersey Assessment of Skills and Knowledge (NJ ASK 3) Language Arts scores and 60% of the 2009 New Jersey Assessment of Skills and Knowledge (NJ ASK 3) Mathematics scores within 10 percentage points (p. 190). This study examined the Language Arts and Mathematics testing for Grades 3 and 11 within the state of Iowa utilizing only district level demographic data. The next section addresses the conclusions for each of the grade levels and subject areas.

Summary of Findings

Iowa Test of Basic Skills 3rd Grade Language Arts: Variable

The results of this study showed that 20.4% of the variance in 2010 ITBS 3rd grade Language Arts scores can be explained by community demographic variables. Although this might be considered a small percentage of the variance explained, it was still found to be statistically significant. The existing empirical literature and results from this study suggest standardized test scores are significantly influenced by community demographic variables. The three variables identified by this study to have the greatest influence on ITBS 3rd Grade Language Arts scores are percentage of household without a high school diploma (% no high school), contributing 3.9% of the explained variance to the model; percentage of female head of household (% female-only parent), contributing 9.1% of the explained variance to the model; and percentage of two-parent household with children under 18 (% families with children) contributing 4.3% of the explained variance to the model. These three variables were entered into the predictive algorithm and correctly predicted, within the standard error of estimate for this model (8.19073), the percentage of students scoring proficient or above on the 2010 3rd grade ITBS Language Arts section for 70% of the school districts in the sample. This study highlights the importance of family supports, especially the need for both male and female guardian support within the home.

Iowa Test of Basic Skills 3rd Grade Mathematics: Variable

The results of this study showed that 12.2% of the variance in 2010 ITBS 3rd grade Mathematics scores can be explained by community demographic variables. The existing empirical literature and results from this study, although small, suggest standardized test scores are significantly influenced by community demographic variables. The two variables identified by this study to have the greatest influence on ITBS 3rd grade Mathematics scores are percentage of population with a single-parent home (% single parent), contributing 4.8% of the explained variance to the model, and percentage of no high school diploma (% no high school), contributing 3.5% of the explained variance to the model. These two variables were entered into the predictive algorithm and correctly predicted, within the standard error of estimate for this model (8.99045), the percentage of students scoring proficient or above on the 2010 3rd grade ITBS Mathematics section for 71% of the school districts in the sample. The study also supports the negative influence households with no high school diplomas have on standardized assessment results.

Iowa Test of Educational Development 11th Grade Language Arts: Variable

The results of this study showed that 20.3% of the variance in 2010 ITED 11th grade Language Arts scores can be explained by community demographic variables. The existing empirical literature and results from this study suggest standardized test scores are significantly influenced by community demographic variables. The three factors identified by this study to have the greatest influence on 2010 ITED 11th grade Language Arts scores are percentage of population with no high school diploma (% no high school), contributing 2.9% of the explained variance to the model; percentage female-only households (% female-only parent), contributing 4.5% of the explained variance to the model; and percentage population with bachelor's degree (% bachelor's degree), contributing 4.0% of the explained variance to the model. These three variables were entered into the predictive algorithm and correctly predicted, within the standard error of estimate for this model (6.53899), the percentage of students scoring proficient or above on the 2010 ITED 11th grade Language Arts section for 73% of the school districts in the sample. This model produced the smallest standard error of estimate compared to the other three models, therefore indicating this model as the most reliable predictor of the four models as well as being a strong predictor of 11th grade ITED Language Arts scores. This study highlights the importance of family supports, especially the need for both male and female guardian support within the home. The study also supports the negative influence of households with no high school diploma on standardized assessment results. Conversely, the results also support the positive influence households with a bachelor's degree have on standardized assessment results.

Iowa Test of Educational Development 11th Grade Mathematics: Variable

The results of this study showed that 23.6% of the variance in 2010 ITED 11th grade Mathematics scores can be explained by community demographic variables. The existing empirical literature and results from this study suggest standardized test scores are significantly influenced by community demographic factors. The four factors identified by this study to have the greatest influence on 2010 ITED 11th grade Mathematics scores are percentage of population with no high school diploma (% no high school), contributing 3.1% of the explained variance to the model; percentage female-only households (% female-only parent), contributing 6.8% of the explained variance to the model; median income (median income), contributing 12.3% of the explained variance to the model; and percentage population making less than $25,000 a year (% less $ 25K), contributing 5.5% of the explained variance to the model. Two variables (% no high school and % female-only parent) were entered into the predictive algorithm and correctly predicted, within the standard error of estimate for this model (6.94911), the percentage of students scoring proficient or above on the 2010 11th grade Mathematics section for 69% of the school districts in the sample. This study highlights the importance of family supports, especially the need for both male and female guardian support within the home. The study also supports the positive influence of median income on standardized assessment results.

Conclusions and Discussion

This study discovered a level of correlation between community demographic factors and aggregate district student achievement on the 2010 ITBS 3rd grade and ITED 11th grade Language Arts and Mathematics scores. While previous studies demonstrate the influence of out-of-school factors on standardized test scores, this study further explained this influence by demonstrating the degree to which specific variables explain the variance in standardized Language Arts and Mathematics assessments at the 3rd and 11th grade levels. This study also identified how a combination of community demographic factors can be used to predict the actual scores of a school district's Language Arts and Mathematics standardized assessments.

Using only community demographic factors, this study successfully predicted as much as 73% (11th grade Language Arts) of the actual 2010 ITBS/ITED scores and as much as 69% (11th Grade Mathematics) of the actual 2010 ITBS/ITED scores. While the R^2 results for the four models predicted as much as 23.6% (11th grade Mathematics) and as much as 12.2% (3rd grade Mathematics) of the explained variance in the 2010 ITBS/ITED Language Arts and Mathematics scores, the models identified specific, statistically significant variables that occurred within all four models (see Table 25). Percentage no high school diploma (% no high school) appeared as a significant variable in all four models. Percentage female-only parent (% female-only parent) appeared as a significant variable in three models; and in the only model in which it did not appear, percentage lone-parent household (% single parent) was the significant variable. The models reveal, in accordance with the negative betas, the two variables (% no high school, % female-only parent) lead to a decrease in standardized achievement for students from these households.

Table 25

Statistically Significant Predictors of 2010 3rd and 11th Grade ITBS/ITED Language Arts and Mathematics Scores

Dependent Variables	Significant Predictors
% 3rd Grade LA Proficiency	% no high school % female-only parent % families with children
% 3rd Grade Math Proficiency	% single parent % no high school
% 11th Grade LA Proficiency	% no high school % female-only parent % bachelor's degree
%11th Grade Math Proficiency	% no high school % female-only parent Median Income % less 25K

When the predictive algorithm was applied, the study revealed that 2010 ITED 11th grade Language Arts and Mathematics are the strongest predictive models in comparison to the results for 2010 ITBS 3rd grade Language Arts and Mathematics. The 11th grade models produced a significantly smaller standard error of estimate for both Language Arts and Mathematics than the 3rd grade models, suggesting greater predictive strength.

While the multiple stepwise regressions revealed statistically significant variables, as mentioned above, it must be noted that the greatest amount of total variance explained was 23.6% in Model 3 for 11th grade Mathematics. None of the statistical outputs revealed more than a quarter of the explained variance as a result of community demographic factors. In comparison, Maylone's (2002) and Turnamian's (2012) research revealed over half of the total explained variance was attributed to community demographic factors. Yet it must also be noted that in 2010, Iowa school districts as a whole posted a 76.4% proficiency rate for 3rd grade Language Arts, a 77.2% proficiency rate for 3rd grade Mathematics, a 78.9% proficiency rate for 11th grade Language Arts, and a 78.2% proficiency rate for 11th grade Mathematics. The sample for this study posted an overall proficiency rate of 78.3% in 3rd grade Language Arts, 79.9% in 3rd grade Mathematics, 79.2% in 11th grade Language Arts, and 79.9% in 11th grade Mathematics. Since the aggregate proficiency rate for all 2010 Iowa school districts and the aggregate rate for the study's sample is high, this may further explain why the variance explained in the models remains low in comparison to previous studies in different states with much lower overall proficiency rates.

In review, this presents an interesting dynamic that may be germane to Iowa in comparison to New Jersey and Michigan. For example, Turnamian's (2012) sample included 460 New Jersey school districts; Maylone's (2002) sample included 522 Michigan school districts versus the 160 stratified random sample chosen from the total Iowa school districts available. Since the Iowa sample is smaller, there is a chance this reduced the overall variability which could impact the R^2 results. It is also very possible there is less variability in Iowa as compared to New Jersey and Michigan in terms of community demographic factors. This could also lend explanation to the deflated R^2 results.

Overall, the smaller R^2 results could represent regional differences between states like New Jersey and Michigan and a state like Iowa. This study represents the first of its kind using school and community data in the state of Iowa, eliminating the possibility of benchmarking against prior results. Yet, this leads to the possibility of conducting future statistical analyses utilizing all school districts in Iowa in order to further examine potential regional differences given a larger sample size.

As a result of this study and the predictive nature of the models, standardized assessments may say little about student achievement and more about community demographic factors and their influence on standardized assessments.

> Coleman et al. reported in 1966 that the greatest influence on student academic performance was socioeconomic status (SES), followed by teacher characteristics and class size. Over 40 years after the release of the Coleman Report (1966), much of the reviewed literature continues to support the original findings of Coleman et al. After reviewing the extensive literature available regarding the potential attainment of educational equality among students, it is evident that enacting accountability policies, providing additional funding, using high-stakes consequences and the results from those tests as major indicators of student academic success, and providing an increased number of education resources to struggling schools will not, in and of themselves, lead to the successful bridging of existing achievement gaps at the state and national testing level (Lee, 2002; Periera, 2011).

This study further supports the above conclusion. While the data did not reveal the same level of variance explained by the research of Maylone (2002) and Turnamian

(2012), the models did produce similar statistically significant variables that also lead to the successful prediction of actual standardized scores using the predictive algorithm employed by both researchers above.

Since the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983), high-stakes assessments have driven education policy while the research concerning the effectiveness of such policies remains inconclusive at best (Amrein & Berliner, 2002; Amrein & Berliner, 2002; Nagaoka & Roderick, 2005; Rustique-Forrester, 2005). With the reauthorization of the Elementary and Secondary Education Act (ESEA, P.L. 89-10), known as the No Child Left Behind Act (NCLB P.L. 107-110), one of the primary objectives has been the elimination of achievement gaps as measured by standardized test results, yet the evidence of such policies having succeeded in doing so remain inconclusive as well (Center on Education Policy, 2009). To this point, Turnamian (2012) poses the question: "Can it simply be coincidental that the increased influence of essentialist thinking over education policy coincided with the reversal of gains in closing the achievement gap as evidenced by NAEP scores?" (p. 59).

In order to answer Turnamian's question, one must return to the seminal work of The Coleman Report (Coleman, Hobson, McPartland, Mood, Weinfield, & York, 1966), the largest survey of public education to date. The report concluded that schools were unlikely to be a viable agent in equalizing the disparity in students' academic achievement due to community demographic factors. More specifically, the research reported that schools account for only about 10% of the variances in student achievement. The other 90% percent was attributed to student background characteristics (Marzano, 2000). Christopher Jencks (1972) and colleagues published *Inequality: A Reassessment* *of the Effects of Family and Schooling in America* that further corroborated the results of the Coleman Report. While this study does not corroborate the Coleman Report's 90% attribution to community demographic factors, it does lend further support to the successful prediction of standardized test scores solely utilizing community demographic factors.

Recommendations for Policy and Practice

The United States education system sits in a precarious position in terms of education policy. The Elementary and Secondary Education Act (ESEA) is long overdue for reauthorization, and education policy continues to move in a direction that relies almost exclusively on standardized test results in order to gauge student and school success (e.g., NCLB, ESEA Flexibility Waivers). This study and the extant literature reviewed demonstrate the flaws of solely relying on standardized test scores to measure and define student learning. In order to move education policy forward, and in the best interest of both student and schools, education leaders must continue to make policy-makers aware of the empirical evidence warning against such a narrow definition of student achievement.

A balance of state standardized assessments and formative assessments must be struck in order to align with empirical evidence. "The existing empirical literature and the results from this study seem to suggest that the more proximal (closer to the student) the formative assessment activity is (i.e., self-evaluation), the greater the influence it has on learning" (Pereira, 2011). This begs the question, if standardized assessments continue to be the sole means of assessing students, schools, and districts, then what are these results truly measuring?

This study, in concert with a myriad of other studies (Coleman et al., 1966; Jencks et al., 1972; Maylone, 2002; Turnamian, 2012; Sirin, 2005; Roscigno & Ainsworth-Darnell, 1999), demands that consideration be given to a more fair and balanced definition of student achievement. Standardized assessments serve a purpose, yet they are only one indicator of student learning. Simply put, current education policy offers a dearth of reliance on education research. This country's reliance on the essentialist paradigm offers no credence to the complexities inherent in educating all children, not the select few allowed to attend or the select few that schools choose to enroll, but all children of all types of backgrounds and circumstances.

This study, along with similar preceding studies in Michigan (Maylone, 2002), New Jersey (Turnamian, 2012), and Connecticut (Sackley, 2014), reveal a serious flaw in how schools are assessed and at the very least reveal the need to re-examine how the federal and state governments define student achievement. Interestingly enough, one of the two testing consortiums supported by Race to the Top funds is titled Smarter Balance Assessment Consortium (SBAC). The Smarter Balance (2014) website states, "The work of Smarter Balanced is guided by the belief that a high-quality assessment system can provide information and tools for teachers and schools to improve instruction and help students succeed—regardless of disability, language, or subgroup. Smarter Balanced involves experienced educators, researchers, state and local policymakers and community groups working together in a transparent and consensus-driven process" (p. 1). Yet, the assessment designers have yet to produce evidence of how this system of assessment moves beyond the typical statewide testing practices of the past. The 17 states (one of which is Iowa) supporting the implementation of SBAC assessments are simply replacing the previous statewide tests with the SBAC assessments, leading one to ask whether or not these "next generation assessments" truly represent a smarter and more fairly balanced approach to student assessment. Regardless of the tests being used this spring as part of the Common Core Assessment Consortium, students and educators do deserve smarter and fairly balanced assessments.

The real influence, however, occurs with those on the frontlines, the practitioners. In order to heed the results of this study and the supporting literature, practitioners would be better served by spending less time teaching to the test and more time working to foster community-based partnerships in order to help reduce the influence of student background characteristics. On the contrary, the current education climate has led many practitioners to carve out more and more school time to focus on tested subject areas, primarily reading and math, and in turn further narrowing the curriculum for students. This has especially affected schools of persistently low achieving status that quite often educate the most diverse set of students that are more than likely influenced by the community demographic factors identified in this study as negatively influencing student achievement. Instead of widening the experiences for such students and searching for means of fostering student support beyond the school doors, most practitioners continue to feel limited to content-area interventions only.

As scholars continue to unpack the Coleman Report's (1966) findings 50 years later, practitioners would be wise to focus on the following levers of support within their school and districts:

- Early childhood programs pre-kindergarten
- Health

- Nutrition
- After-school programs
- Summer and school break learning opportunities
- School funding

Each of these represents disparities in opportunity not caused or controlled by the school.

Given the results of this study, policymakers need to allocate more funding to strategies and programs that work to address and reduce the community demographic factors that impact student learning. Evidence clearly supports the need for interventions to begin long before students enter through the school doors. Since 2007, the Iowa State Board of Education and legislators have supported the statewide Voluntary Preschool Program for Four-Year Olds; however, since Governor Branstad's election in 2010 his administration has threatened to remove funding for this program. From 2002 to 2009, Early Elementary Innovative Grants supported districts' work in intervening with K-3 at-risk populations. The grants were discontinued at the end of the 2009 school year. This funding was rolled into the state aid formula for the 2009-2010 school year and has since been aided by the Iowa Early Intervention Block Grant Program. Unfortunately, the majority of these programs are supported by grant money or American Recovery and Reinvestment Act (ARRA) funds, non-renewable funds. If policymakers and legislators are truly intent on improving test scores and closing achievement gaps, they would be best served by adequately funding programs like Head Start and Early ACCESS that work to tie together service providers like the Department of Education, Department of Human Services, and Child Health Specialty Clinics (Iowa Department of Education, 2013).

Overall Summary

Turnamian (2012) explained 52% of the variance in the 2009 NJ ASK 3 LAL scores, and 60% of the variance in the 2009 NJ ASK 3 Math scores by utilizing three community demographic variables: percentage of lone-parent households, percentage with bachelor's degrees, and percentage of economically disadvantaged families. Turnamian's study built upon Maylone's (2002) study in Michigan that produced similar results utilizing similar community demographic variables.

This study revealed that 20.4% of the variance in 2010 ITBS 3rd grade Language Arts scores can be explained by community demographic variables, 12.2% of the variance in 2010 ITBS 3rd grade Mathematics scores can be explained by community demographic variables, 20.3% of the variance in 2010 ITED 11th grade Language Arts scores can be explained by community demographic variables, and 23.6% of the variance in 2010 ITED 11th grade Mathematics scores can be explained by community demographic variables. Using only community demographic factors, this study successfully predicted as much as 73% (11th grade Language Arts) of the actual 2010 ITBS/ITED scores and as much as 69% (11th grade Mathematics) of the actual 2010 ITBS/ITED scores. The results of this study add to the growing body of research that community demographic factors influence student achievement results.

Recommendations for Future Research

- Conduct a similar study but increase the sample size from 160 districts to all 358 districts from school year 2009-2010.
- Conduct a similar study in another Midwest state that mirrors similar demographics as Iowa in order to compare outcomes.

- Conduct a study of the schools in which the greatest margins of error were identified by the predictive formula in order to determine if schools in which the actual score was greater than the predicted score are implementing more effective practices.
- Conduct a study of the schools in which the greatest margins of error were identified by the predictive formula in order to determine if schools in which the actual score was lower than the predicted score are implementing ineffective practices.
- Conduct an analysis of the school districts that were not successful in using the predictive model in order to explore why this was the case.
- Conduct similar studies in other states to examine how community demographic factors affect student achievement results.
- Utilize the results of this study to examine school-level data collection in comparison to the variables represented in the statistical models.
- Conduct a study of schools with high poverty levels that show above average student achievement in order to identify the supports in place leading to student achievement gains.
- Conduct a study to see how a school's culture and climate impact the effect of community demographic factors.
- Conduct a study to determine the effectiveness of early learning interventions programs.
- Conduct a study to determine how funding would shift if the focus of the spending was tied more closely to issues of poverty.

Research well beyond the expertise and scope of this study supports the fact that student, family, and community demographics drive the current "achievement gaps." All these "gaps" are the result of underlying problems often masked by the attempts of education policy to resolve them through school factors alone. It is time to treat the disease and not merely the symptoms.

References

Adler, M. J. (1982). *The paideia proposal: An educational manifesto*. New York, NY: Simon & Schuster.

Aiken, W. M. (1942). *The story of the eight-year study*. New York, NY: Simon & Schuster.

Alspaugh, J. (1991). Out-of-school environmental factors and elementary school achievement in mathematics and reading. *Journal of Research and Development in Education*, *24*(3), 53-55.

American Educational Research Association, American Psychological Association, and National Council on Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.

Amrein, A. L., & Berliner, D. C. (2002, December). *An analysis of some unintended and negative consequence of high-stakes testing*. East Lansing, MI: The Great Lakes Center for Education Research & Practice.

Apple, M. (2004). *Ideology and curriculum* (3rd ed.). New York, NY: Routledge Falmer.

Averch, H. A., Carroll, S. J., Donaldson, T. S., Kiesling, H. J., & Pincus, J. (1974). *How effective is schooling? A critical review of research*. Englewood Cliffs, NJ: Educational Technology Publications.

Baum, C. L. (2004). The long-term effects of early and recent maternal employment on a child's academic achievement. *Journal of Family Issues, 25,* 29-60.

Bagley, W. (1934). *Education and emergent man: A theory of education with* *particular application to public education in the United States*. New York, NY: Nelson and Sons.

Bain, H., Boesrma, F., & Chapman, J. (1983). Academic achievement and locus of control in father-absent elementary school children. *School Psychology International, 4*, 69-78.

Ballantyne, P. (2002). *Psychology, society, and ability testing (1859-2002): Transformative alternatives to mental Darwinism and interactionism*. Toronto, Canada: International Society for Theoretical Psychology. Retrieved from http://www.igs.net/~pballan/Toc1.htm

Beck, B. (1995). *State-mandated test score accountability: Its usefulness and meaning for schools*. Salt Lake City, UT: The University of Utah.

Berliner, D. C. (2009). *Poverty and potential: Out-of-school factors and school success*. Boulder, CO and Tempe, AZ: Education and Public Interest Center & Education Policy Research Unit. Retrieved from http://epicpolicy.org/publication/poverty-and-potential

Bestor, A. (1953). *Educational wastelands: The retreat from learning in our public schools*. Champaign, IL: University of Illinois.

Bestor, A. (1955). *The restoration of learning: A program for redeeming the unfulfilled promise of American education*. New York, NY: Knopf.

Blank, R. M. (2002). Evaluating welfare reform in the United States. *Journal Economic Literature, 40*, 1105-1166.

Blau, F. D., & Grossberg, A. J. (1992). Maternal labor supply and children's cognitive development. *Review o f Economics and Statistics, 74,* 474-481.

Burchinal, M. R., Follmer, A., & Bryant, D. M. (1996). The relations of maternal social support and family structure with maternal responsiveness and child outcomes among African American families. *Developmental Psychology*, *32*, 1073-1083.

Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher, 34*(6), 3-15.

Byrk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models*. New York, NY: Sage.

Cappella, E., & Lamer, M. B. (1999). America's schoolchildren: Past, present, and future. *The Future o f Children, 9,* 21-29.

Carnoy, M., & Loeb, S. (2002). Does external accountability affect student out-comes? A cross-state analysis. *Educational Evaluation and Policy Analysis. 24*(4), 305.

Center for K-12 Assessment and Performance Management. (2010). *Enhancing assessments to support teaching and learning next generation assessment systems proposed under the race to the top program*. Retrieved from Educational Testing Service website: http://www.k12center.org/rsc/pdf/15051-K12Cntr-RTTTbro-Digital.pdf

Center on Education Policy. (2010, December). *Slow and uneven progress in narrowing gaps.* Washington, DC: Center on Education Policy.

Cronbach, L. J. (1971). Test validation. In R.L. Thorndike (Ed.), *Educational measurement*. Washington, DC: American Council on Education.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests.

Psychological Bulletin, *52*, 281-302.

Coleman, J. S. (1966). *Equality of educational opportunity*. Ann Arbor, MI: Inter-University Consortium for Political Social Research. 2007-04-27. doi:10.3886/ICPSR06389.v3

Coley, R. J., & Baker, B. (2013). *Poverty and education: Finding the way forward*. Retrieved from Educational Testing Service website: http://www.ets.org.

Cooper, K., & Stewart, K. (2013). *Does money affect children's outcomes? A systemic review*. Retrieved from Joseph Rowntree Foundation website: http://http://www.jrf.org.uk/sites/files/jrf/money-children-outcomes-full.pdf

Corcoran, M., Danziger, S. K., Kalil, A., & Seefeldt, K. S. (2000). How welfare reform is affecting women's work. *Annual Review of Sociology*, *26*, 241-269.

Croley, R., & Baker, B. (2013). Poverty and education: Finding the way forward. In Princeton, NJ: Educational Testing Service. Retrieved from http://www.ets.org/s/research/pdf/poverty_and_education_report.pdf

Cuban, L. (1993). *How teachers taught: Consistency and change in Amercian classrooms 1880-1990*. New York, NY: Teachers College Press.

Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology, 19*(2), 294.

Debell, M. (2008). Children living without their fathers: Population estimates and indicators of well-being. *Social Indicators Research, 87*, 427-443. doi: 10.1007/s11205-007-9149-8

Desai, S., Chase-Lansdale, P. L., & Michael, R. T. (1989). Mother or market: Effects of maternal employment on the intellectual ability of four-year-old children. *Demography, 26,* 545-561.

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York, NY: MacMillan Company.

Dewey, J. (1938). *Experience in education*. New York, NY: Touchstone.

Elder, Jr., G. H. (1998). The life course as developmental theory. *Child Development*, 69, 1- 12.

Elementary and Secondary Education Act of 1965, Pub. L. 89-10.

Entwisle, D. R., & Alexander, K. L. (1992). Summer setback—Race, poverty, school composition, and mathematics in the 1st 2 years of school. *American Sociological Review*, 57, 72-84.

Field, A. P. (2013). Discovering statistics using IBM SPSS Statistics: And sex and drugs and rock 'n' roll (4th ed.). London: Sage.

Gamoran, A., & Long, D. A. (2006). *Equality of Educational Opportunity: A 40-year retrospective* (WCER Working Paper No. 2006-9). Madison, WI: University of Wisconsin–Madison, Wisconsin Center for Education Research. Retrieved from http://www.wcer.wisc.edu/publications/workingPapers/papers.php

Garfinkel, I., & McLanahan, S. (1986). *Single mothers and their children*. Washington, DC: The Urban Institute.

Gay, L. R., Mills, & Airasian, P. (2000). *Educational research: Competencies for analysis and application* (6th ed.). Englewood Cliffs, NJ: Prentice-Hall.

Gold, D., & Andres, D. (1978). Developmental comparison between 10-year-old children with employed and nonemployed mothers. *Child Development, 49,* 75-84.

Goldberg, W. A., Greenberger, E., & Nagel, S. K. (1996). Employment and achievement: Mothers' work involvement in relation to children's achievement behaviors and mothers' parenting behaviors. *Child Development, 67,* 1512-1527.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature*, *49*(3),1141-1147.

Hanushek, E., Kain, J., O'Brien, D., & Rivkin, S. (2004, December). *The market for teacher quality*. American economic association meeting, Philadelphia, PA. doi: http://209.197.108.139/assa/2005/0107_0800_0803.pdf

Hanushek, E. A., & Raymond, M. E. (2003). High-stakes testing: The campaign against accountability has brought about negative anecdotes and deeply flawed research. Solid analysis reveals a brighter picture. *Education Next*, *3*(3).

Hardy, L. (2000). The trouble with standards. *The American School Board Journal, 187*(9), 22-26.

Herman, J. L. (2004). The effects of testing on instruction. In S. Fuhrman & R. Elmore (Eds.), *Redesigning accountability* (pp. 141-166). New York, NY: Teachers College Press.

Hinkle, D. E., Wiersman, W., & Jurs, S. G. (2003). Applied statistics for behavioral sciences. *Peabody Journal of Education*, *67*(3), 3.

Hoffman, L. W. (1989). Effects of maternal employment in the two-parent family. *American Psychologist, 44,* 283-292.

Hofferth, S. L., Stanhope, S., & Harris, K. M. (2002). Exiting welfare in the 1990s: Did public policy influence recipient's behavior? *Population Research and Policy Review*, *21*, 433-472.

Hokayem, C., & Heggeness, M. (2014). Living in near poverty in the United States: 1966-2012. Retrieved from https://www.census.gov/prod/2014pubs/p60-248.pdf

Iowa Testing Programs. (2013). *Reporting Iowa proficiency using standard scores*. Retrieved from http://itp.education.uiowa.edu/ia/documents/Reporting-Iowa-Proficiency-Using-Standard-Scores.pdf

Iowa Department of Education. (2012). *Statewide assessment requirements*. Retrieved from https://www.educateiowa.gov/pk-12/student-assessment/statewide-assessment-requirements-0

Iowa Department of Education. (2013, November 7). *Iowa's NAEP results show some gains, need for improvement*. Retrieved from https://www.educateiowa.gov/article/2013/11/25/iowa-s-naep-results-show-some-gains-need-improvement

ITBS research guide. (2012). Retrieved from http://itp.education.uiowa.edu/ia/documents/ITBS-Research-Guide.pdf

Jencks, C., Smith, M., Acland, H., Bane, M. S., Cohen, D., Gintis, H. (1972). *Inequality: A reassessment of the effect of family and schooling in America*. New York, NY: Basic Books.

Jimerson, S., Egeland, B., & Teo, A. (1999). A longitudinal study of achievement trajectories associated with change. *Journal of Educational Psychology, 91*, 116.

Johnson, B. (2001). Toward a new classification of nonexperimental quantitative research. *Educational Researcher*, 3-13.

Jones, M. (2008). *The influence of variables on school report cards regarding the passing rates for students taking the high school proficiency assessment (HSPA) in New Jersey comprehensive high schools* (Doctoral dissertation). Retrieved from http://gradworks.umi.comJ33/19/3319531.html

Kerris, C., & Kitty, S. (2013). Does money affect children's outcomes? Joseph Rowntree Foundation. Retrieved from http://www.jrf.org.uk/publications/does-money-affect-childrens-outcomes

Kerlinger, F. N. (1986). *Foundations of behavioral research* (3rd ed.). New York, NY: Holt, Rhinehart, & Winston.

Kirp, D. L. (1977). Law, politics, and equal opportunity: The limits of judicial involvement. *Harvard Educational Review, 47*, 117-136.

Klebanov, P. K., Brooks-Gunn, J., & Duncan, G. J. (1994). Does neighborhood and family poverty affect mothers' parenting, mental health, and social support? *Journal of Marriage and Family, 56*, 471.

Kohm, M. L. (1963). Social class and parent-child relationships: An interpretation. *American Journal of Sociology, 68*, 471.

Krein, S. F., & Beller, S. H. (1988). Educational attainment of children from single-parent families: Differences by exposure, gender, and race. *Demography*, *25*, 221-234.

Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity? *Educational Researcher*, *31*(13), 12.

Leech, N., & Barrett, K. (2011). *IBM SPSS for intermediate statistics: Use and interpretation* (4th ed.). New York, NY: Routledge.

Lichter, D. T., & Eggebeen, D. J. (1994). The effect of parental employment on child poverty. *Journal of Marriage and the Family*, *56*, 633-645.

Luster, T., Rhodes, K., & Hass, B. (1989). The relation between parental values and parenting behavior: A test of the Kohn hypothesis. *Journal of Marriage and Family, 51*, 139.

Madaus, G. F. (1988). The influence of testing on the curriculum. In L. N. Tanner (Ed.), *Critical issues in curriculum: Eighty-seventh yearbook of the National Society for the Study of Education* (pp. 83–121). Chicago, IL: University of Chicago Press.

Madaus, G. F., Higgins, J., & Russell, M. K. (2009). *The paradoxes of high stakes: How they affect students, their parents, teachers, principals, schools, and society*. Charlotte, NC: Information Age Publishers.

Mandara, J., & Murray, C. (2006). Fathers' absence and African American adolescent drug use. *Journal of Divorce and Remarriage, 46*, 1-12.

Marzano, R. J. (2000). *A new era of school reform: Going where the research takes us*. Aurora, CO: Mid-continent Research for Education and Learning.

Maylone, N. (2002). *The relationship of socioeconomic factors and district scores on the Michigan educational program tests: An analysis.* (Unpublished doctoral dissertation). Eastern Michigan University, Ypsilanti, MI.

McLanahan, S. (1985). Family structure and the reproduction of poverty. *The American Journal of Sociology*, 90, 873-901.

McLanahan, S., & Sandefur, G. (1994). *Growing up with a single parent*. Cambridge, MA: Harvard University Press.

Milne, A. M., Myers, D. E., Rosenthal, A. S., & Ginsburg, A. (1986). Single parents, working mothers, and the educational-achievement of schoolchildren. *Sociology of Education, 59,* 125-139.

Moore, K. M., & Driscoll, A. K. (1997). Low-wage maternal employment and outcomes for children: A study. *The Future of Children, 7,* 122-127.

Morris, P. A., Huston, A. C., Duncan, G. J., Crosby, D. A., & Bos, J. M. (2001). *How welfare and work policies affect children: A synthesis of research.* New York, NY: Manpower Demonstration Research Corporation.

Nagaoka, J., & Roderick, M. (2005). Retention under Chicago's high-stakes testing program: Helpful, harmful, or harmless? *Educational Evaluation and Policy Analysis*, *27*(4), 309-340.

National Commission on Excellence in Education (NCEE). (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: U.S. Government Printing Office.

National Council on Teacher Quality. (2012). State of the states 2012: Teacher effectiveness policies. Washington, DC: National Council on Teacher Quality. Retrieved from http://www.nctq.org/dmsView/ State_of_the_States_2012_ Teacher_Effectiveness_Policies_NCTQ_Report

National Defense Education Act P.L. 85-864; 72 Stat. 1580 (1958).

National Education Association of the United States, Commission on the Reorganization of Secondary Education. (1918). *Cardinal principles of secondary education: A report of the commission on the reorganization of secondary education, appointed by the National Education Association,* No. 31-36. Washington, DC: U.S. Government Printing Office.

National Governor's Association. (2013, July 20). *Common core state standards*. Retrieved from http://www.nga.org/cms/home/nga-center-for-best-practices/center-issues/page-edu-issues/col2-content/main-content-list/common-core-state-standards.html

Nehring, J. (2006). Progessivism vs. traditional: Reframing an old debate. *Education Week*. Retrieved from http://www.edweek.org/ew/articles/2006/02/01/21nehring.h25.html

Orfield, G., & Wald, J. (2000). Testing, testing: The high-stakes testing mania hurts poor and minority students the most. *Nation*, *270*(22), 38–40.

Payne, K. J., & Biddle, B. J. (1999). Poor school funding, child poverty and mathematics achievement. *Educational Researcher*, *28*(6), 4-13.

Periera, M. A. (2011). *The influence of student and school variables on student performance on the New Jersey Assessment of Skills and Knowledge in Grade 8*. (Doctoral dissertation). Retrieved from http://domapp01.shuedu/depts./uc/apps/libraryrespository.nsf/resourceid/AF5C74EF331500F58525784E005100E4$File/Pereira_Maria_A_Doctorate.pdf?Open

Popham, W. (1998). *Tests that help teaching: A personal odyssey*. Los Angeles, CA: IOX Assessment Associates.

Porter, A. C. (2003, October). Prospects for school reform and closing the achievement gap. Paper presented at the Educational Testing Service Invitational Conference, New York City, NY.

Ricciuti, H. N. (1999). Single parenthood and school readiness in White, Black, and Hispanic 6- and 7-year-olds. *Journal of Family Psychology*, *13*, 450-465.

Ricciuti, H. N. (2004). Single parenthood, achievement, and problem behavior in White, Black, and Hispanic children. *Journal of Family Psychology*, *97*, 196-206.

Rippa, A. (1997). *Education in a free society: An American history*. New York, NY: Longman.

Ritchie, C. (1971). The eight-year study: Can we afford to ignore it? *Educational Leadership*, 484-486. Retrieved from http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_197102_ritchie.pdf

Roscigno, V. J., & Ainsworth-Darnell, J. J. (1999). Race, cultural capital, and educational resources: Persistent inequalities and achievement returns. *Sociology of Education*, *72*(3), 158-178.

Rothman, R., Slattery, J. B., Vranek, J. L., & Resnick, L. B. (2002). *Benchmarking and alignment of standards and testing* (CSE Tech. Rep. No. 566). Los Angeles, CA: University of California, National Center for Research on Evaluation, Standards, and Student Testing (CRESST).

Rothstein, R. (2007, April). *Class and the classroom: Even the best schools can't close the achievement gap*. Paper presented at the12th national conference on children and the law, Cambridge, MA.

Rustique-Forrester, E. (2005). Accountability and the pressure to exclude: A cautionary tale from England. *Education Policy Analysis Archives*, *13*(26) Retrieved from http://www.facso.uchile.cl/psicologia/epe/_documentos/GT_cultura_escolar_polit ica_educativa/recursos%20bibliograficos/articulos%20relacionado/rustique(2005)accountabilityandthepressurestoexclude.pdf

Schneider, A. L., & Ingram, H. (1997). Policy design for democracy. Lawrence, KS: University of Kansas.

Schoenfeld, A. (2004). The math wars. *Educational Policy*, *18*(1), 253-286.

School Superintendents Association (2012, Decemeber). *Moco school chief calls for three-year moratorium on standardized testing*. Retrieved from http://www.aasa.org/headlinecontent.aspx?id=26164

Shepard, L. (2000). The role of assessment in a learning culture. *Educational Researcher*, *29*(7), 4-14.

Shinn, M. (1978). Father absence and children's cognitive development. *Psychological Bulletin*, *85*, 295-324.

Sigle-Rushton, W., & McLanahan, S. (2004). Father absence and child well-being: A critical review. In D. Moynihan, T. Smeeding, & L. Rainwater (Eds.), *The future of the family* (pp. 116-155). New York, NY: Russell Sage Foundation.

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, *75*(3), 417-453.

Sizer, T. R. (1984). *Horace's compromise: The dilemma of the American high school*. New York, NY: Houghton Mifflin Company.

Sizer, T. R. (1985). *The shopping mall high school: Winners and losers in the educational marketplace*. New York, NY: Houghton Mifflin Company.

Skinner, R. A. (2005, January 6). State of the states. *Education Week*, *24*(17), 77-106.

Smith, E. P., Atkins, J., & Connell, C. M. (2003). Family, school, and community factors and relationships to racial-ethnic attitudes and academic achievement. *American Journal o f Community Psychology, 32,* 159-173.

Smith, S., & Jorgenson, O. (1997). Test prep 101. *The American School Board Journal*, *184*(9), 46-7.

Solow, R. M. (1956). A theory to the theory of economic growth. *The Quarterly Journal of Economics*, 65-94.

Tanner, D. l., & Tanner, L. (2007). *Curriculum development: Theory into practice* (4th Ed.). Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Tienken, C. H., & Orlich, D. C. (2013). *The school reform landscape: Fraud, myth, and lies*. New York, NY: Rowman & Littlefield Education.

Tienken, C. H., & Rodriguez, O. (2010). The error of state mandated high school exams. *Academic Exchange Quarterly*, *14*(2), 50-55.

Todd, P. E., & Wolpin, K. I. (2003). On the specification and estimation of the production function for cognitive achievement. *The Economic Journal*, *113*, 3-33.

Turnamian, P. G. (2012). *The value of NJ school district demographic data in explaining school district NJ ASK Grade 3 Language Arts and Mathematics scores* (Doctoral dissertation). Retrieved from Seton Hall University Dissertations and Theses (ETDs). Paper 1778.

U.S. Census Bureau. (2003a). Current population survey, annual social and economic supplements. Table 10: Related children in female householder families as a proportion of all related children, by poverty status: 1959 to 2003. Retrieved from http://www.census.gov/hhes/poverty/histpov/hstpovlO.html

U.S. Census Bureau. (2003b). Current population survey, annual social and economic supplements. Table 13: Number of families below the poverty level and poverty rate:1959 to 2003. Retrieved from http://www.census.gov/hhes/poverty/histpov/hstpov13.html

U.S. Census Bureau. (2010). Demographic profile. Washington, DC: Author.

Wallerstein, J., & Blakeslee, S. (1989). *Second chances: Men, women, and children a decade after divorce*. New York, NY: Ticknor & Fields.

White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin*, 461-481.

Zaslow, M. J., & Emig, C. A. (1997). When low-income mothers go to work: Implications for children. *The Future of Children, 7,* 110-115.

Zedlewski, S. R. (2002). Family economic resources in the post-reform era. *The Future of Children*, *12*, 121-145.

Zick, C. D., Byrant, W. K., & Osterbacka, E. (2001). Mother's employment, parental involvement, and the implications for intermediate child outcomes. *Social Science Research*, *30*, 25-49.

Appendix A

Pearson Correlation Coefficient Scores for All Variables where N = 159

Correlations

		% 3rd Grade LA Proficiency	% 3rd Grade Math Proficiency	% 11th Grade LA Proficiency	% 11th Grade Math Proficiency	% families below poverty	Median income	% less $25k
% 3rd Grade LA Proficiency	Pearson Correlation	1	.566**	.308**	.408**	-.324**	.262**	-.246**
	Sig. (2-tailed)		.000	.000	.000	.000	.001	.002
	N	159	159	159	159	159	159	159
% 3rd Grade Math Proficiency	Pearson Correlation	.566**	1	.216**	.262**	-.249**	.168*	-.222**
	Sig. (2-tailed)	.000		.006	.001	.002	.034	.005
	N	159	159	159	159	159	159	159
% 11th Grade LA Proficiency	Pearson Correlation	.308**	.216**	1	.628**	-.286**	.256**	-.174*
	Sig. (2-tailed)	.000	.006		.000	.000	.001	.028
	N	159	159	159	159	159	159	159
% 11th Grade Math Proficiency	Pearson Correlation	.408**	.262**	.628**	1	-.286**	.335**	-.147
	Sig. (2-tailed)	.000	.001	.000		.000	.000	.065

	N	159	159	159	159	159	159	159
% families below poverty	Pearson Correlation	-.324**	-.249**	-.286**	-.286**	1	-.536**	.535**
	Sig. (2-tailed)	.000	.002	.000	.000		.000	.000
	N	159	159	159	159	159	159	159
Median income	Pearson Correlation	.262**	.168*	.256**	.335**	-.536**	1	-.677**
	Sig. (2-tailed)	.001	.034	.001	.000	.000		.000
	N	159	159	159	159	159	159	159
% less $25k	Pearson Correlation	-.246**	-.222**	-.174*	-.147	.535**	-.677**	1
	Sig. (2-tailed)	.002	.005	.028	.065	.000	.000	
	N	159	159	159	159	159	159	159
% less $35k	Pearson Correlation	-.223**	-.093	-.202*	-.210**	.277**	-.494**	.420**
	Sig. (2-tailed)	.005	.244	.011	.008	.000	.000	.000
	N	159	159	159	159	159	159	159
% $200,000 or more	Pearson Correlation	.216**	.204**	.229**	.232**	-.304**	.532**	-.370**
	Sig. (2-tailed)	.006	.010	.004	.003	.000	.000	.000
	N	159	159	159	159	159	159	159

% families with children	Pearson Correlation	.168*	.014	.019	.099	-.104	.522**	-.292**
	Sig. (2-tailed)	.034	.857	.815	.216	.190	.000	.000
	N	159	159	159	159	159	159	159
% female only parent	Pearson Correlation	-.336**	-.289**	-.320**	-.345**	.499**	-.199*	.240**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.012	.002
	N	159	159	159	159	159	159	159
% male only parent	Pearson Correlation	-.191*	-.287**	-.299**	-.194*	.317**	-.157*	.336**
	Sig. (2-tailed)	.016	.000	.000	.015	.000	.049	.000
	N	159	159	159	159	159	159	159
% single parent	Pearson Correlation	-.321**	-.309**	-.344**	-.320**	.510**	-.208**	.324**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.008	.000
	N	159	159	159	159	159	159	159
% no high school	Pearson Correlation	-.343**	-.291**	-.377**	-.353**	.490**	-.517**	.463**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000
	N	159	159	159	159	159	159	159

% high school degree	Pearson Correlation	-.062	-.132	-.171*	-.094	.141	-.373**	.231**
	Sig. (2-tailed)	.437	.097	.031	.239	.076	.000	.003
	N	159	159	159	159	159	159	159
% some college	Pearson Correlation	-.035	-.024	-.082	-.121	.086	-.102	.143
	Sig. (2-tailed)	.664	.765	.304	.130	.282	.201	.072
	N	159	159	159	159	159	159	159
% bachelor's degree	Pearson Correlation	.261**	.241**	.346**	.273**	-.366**	.608**	-.454**
	Sig. (2-tailed)	.001	.002	.000	.000	.000	.000	.000
	N	159	159	159	159	159	159	159
% advanced degree	Pearson Correlation	.136	.221**	.191*	.114	-.142	.258**	-.180*
	Sig. (2-tailed)	.088	.005	.016	.154	.074	.001	.023
	N	159	159	159	159	159	159	159

Correlations

	% less $35k	% $200,000 or more	% families with children	% female only parent	% male only parent	% single parent	% no high school

% 3rd Grade LA Proficiency	Pearson Correlation	-.223	.216**	.168**	-.336**	-.191**	-.321**	-.343**
	Sig. (2-tailed)	.005	.006	.034	.000	.016	.000	.000
	N	159	159	159	159	159	159	159
% 3rd Grade Math Proficiency	Pearson Correlation	-.093**	.204	.014**	-.289**	-.287**	-.309*	-.291**
	Sig. (2-tailed)	.244	.010	.857	.000	.000	.000	.000
	N	159	159	159	159	159	159	159
% 11th Grade LA Proficiency	Pearson Correlation	-.202**	.229**	.019	-.320**	-.299**	-.344**	-.377*
	Sig. (2-tailed)	.011	.004	.815	.000	.000	.000	.000
	N	159	159	159	159	159	159	159
% 11th Grade Math Proficiency	Pearson Correlation	-.210**	.232**	.099**	-.345	-.194**	-.320**	-.353
	Sig. (2-tailed)	.008	.003	.216	.000	.015	.000	.000
	N	159	159	159	159	159	159	159
% families below poverty	Pearson Correlation	.277**	-.304**	-.104**	.499**	.317	.510**	.490**
	Sig. (2-tailed)	.000	.000	.190	.000	.000	.000	.000
	N	159	159	159	159	159	159	159

Median income	Pearson Correlation	-.494**	.532*	.522**	-.199**	-.157**	-.208	-.517**
	Sig. (2-tailed)	.000	.000	.000	.012	.049	.008	.000
	N	159	159	159	159	159	159	159
% less $25k	Pearson Correlation	.420**	-.370**	-.292*	.240	.336**	.324**	.463
	Sig. (2-tailed)	.000	.000	.000	.002	.000	.000	.000
	N	159	159	159	159	159	159	159
% less $35k	Pearson Correlation	1**	-.202	-.229*	.125**	.162**	.168**	.405**
	Sig. (2-tailed)		.011	.004	.116	.041	.035	.000
	N	159	159	159	159	159	159	159
% $200,000 or more	Pearson Correlation	-.202**	1**	.202**	-.194**	-.230**	-.236**	-.302**
	Sig. (2-tailed)	.011		.011	.014	.004	.003	.000
	N	159	159	159	159	159	159	159
% families with children	Pearson Correlation	-.229*	.202	1	.215	.199	.240**	-.129**
	Sig. (2-tailed)	.004	.011		.007	.012	.002	.104
	N	159	159	159	159	159	159	159

% female only parent	Pearson Correlation	.125**	-.194**	.215**	1**	.484**	.942*	.395**
	Sig. (2-tailed)	.116	.014	.007		.000	.000	.000
	N	159	159	159	159	159	159	159
% male only parent	Pearson Correlation	.162*	-.230**	.199**	.484*	1**	.713*	.515**
	Sig. (2-tailed)	.041	.004	.012	.000		.000	.000
	N	159	159	159	159	159	159	159
% single parent	Pearson Correlation	.168**	-.236**	.240**	.942**	.713**	1**	.478**
	Sig. (2-tailed)	.035	.003	.002	.000	.000		.000
	N	159	159	159	159	159	159	159
% no high school	Pearson Correlation	.405**	-.302**	-.129**	.395**	.515**	.478**	1**
	Sig. (2-tailed)	.000	.000	.104	.000	.000	.000	
	N	159	159	159	159	159	159	159
% high school degree	Pearson Correlation	.102	-.517	-.089*	.013	.212	.094**	.222**
	Sig. (2-tailed)	.203	.000	.263	.868	.007	.238	.005
	N	159	159	159	159	159	159	159

% some college	Pearson Correlation	.316	-.119	-.053	.147	.194	.189	.117
	Sig. (2-tailed)	.000	.134	.509	.065	.014	.017	.142
	N	159	159	159	159	159	159	159
% bachelor's degree	Pearson Correlation	$-.309^{**}$	$.596^{**}$	$.222^{**}$	$-.195^{**}$	$-.430^{**}$	$-.302^{**}$	$-.596^{**}$
	Sig. (2-tailed)	.000	.000	.005	.014	.000	.000	.000
	N	159	159	159	159	159	159	159
% advanced degree	Pearson Correlation	-.262	$.495^{**}$	$-.086^{*}$	-.192	-.419	$-.291^{**}$	$-.387^{*}$
	Sig. (2-tailed)	.001	.000	.280	.016	.000	.000	.000
	N	159	159	159	159	159	159	159

Correlations

		% high school degree	% some college	% bachelor's degree	% advanced degree
% 3rd Grade LA Proficiency	Pearson Correlation	-.062	$-.035^{**}$	$.261^{**}$	$.136^{**}$
	Sig. (2-tailed)	.437	.664	.001	.088
	N	159	159	159	159
% 3rd Grade Math Proficiency	Pearson Correlation	$-.132^{**}$	-.024	$.241^{**}$	$.221^{**}$
	Sig. (2-tailed)	.097	.765	.002	.005
	N	159	159	159	159

% 11th Grade LA Proficiency	Pearson Correlation	-.171**	-.082**	.346	.191**
	Sig. (2-tailed)	.031	.304	.000	.016
	N	159	159	159	159
% 11th Grade Math Proficiency	Pearson Correlation	-.094**	-.121**	.273**	.114
	Sig. (2-tailed)	.239	.130	.000	.154
	N	159	159	159	159
% families below poverty	Pearson Correlation	.141**	.086**	-.366**	-.142**
	Sig. (2-tailed)	.076	.282	.000	.074
	N	159	159	159	159
Median income	Pearson Correlation	-.373**	-.102*	.608**	.258**
	Sig. (2-tailed)	.000	.201	.000	.001
	N	159	159	159	159
% less $25k	Pearson Correlation	.231**	.143**	-.454*	-.180
	Sig. (2-tailed)	.003	.072	.000	.023
	N	159	159	159	159
% less $35k	Pearson Correlation	.102**	.316	-.309*	-.262**
	Sig. (2-tailed)	.203	.000	.000	.001
	N	159	159	159	159
% $200,000 or more	Pearson Correlation	-.517**	-.119**	.596**	.495**
	Sig. (2-tailed)	.000	.134	.000	.000
	N	159	159	159	159

% families with children	Pearson Correlation	-.089*	-.053	.222	-.086
	Sig. (2-tailed)	.263	.509	.005	.280
	N	159	159	159	159
% female only parent	Pearson Correlation	.013**	.147**	-.195**	-.192**
	Sig. (2-tailed)	.868	.065	.014	.016
	N	159	159	159	159
% male only parent	Pearson Correlation	.212*	.194**	-.430**	-.419*
	Sig. (2-tailed)	.007	.014	.000	.000
	N	159	159	159	159
% single parent	Pearson Correlation	.094**	.189**	-.302**	-.291**
	Sig. (2-tailed)	.238	.017	.000	.000
	N	159	159	159	159
% no high school	Pearson Correlation	.222**	.117**	-.596**	-.387**
	Sig. (2-tailed)	.005	.142	.000	.000
	N	159	159	159	159
% high school degree	Pearson Correlation	1	-.110	-.724*	-.652
	Sig. (2-tailed)		.167	.000	.000
	N	159	159	159	159
% some college	Pearson Correlation	-.110	1	-.192	-.356
	Sig. (2-tailed)	.167		.015	.000
	N	159	159	159	159

% bachelor's degree	Pearson Correlation	-.724**	-.192**	1**	.666**
	Sig. (2-tailed)	.000	.015		.000
	N	159	159	159	159
% advanced degree	Pearson Correlation	-.652	-.356**	.666*	1
	Sig. (2-tailed)	.000	.000	.000	
	N	159	159	159	159

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Appendix B

Predictive District 2010 ITBS 3rd Grade Language Arts Scores

District Name	Zip Code	Year	3rd Grade Reading % Proficient	Predicted	Diff
AGWSR	50601	2010	84.38	73.3388	11.0412
Adair-Casey	50002	2010	59.26	77.7576	-18.4976
Adel DeSoto Minburn	50003	2010	80.91	**84.9094**	-3.9994
Akron Westfield	51001	2010	79.31	**80.5791**	-1.2691
Albia	52531	2010	83.33	**77.1544**	6.1756
Algona	50511	2010	70.67	79.1844	-8.5144
Allamakee	52140	2010	85.29	**82.7658**	2.5242
Alta	51002	2010	63.16	77.1544	-13.9944
Ames	50010	2010	85.56	**81.7016**	3.8584
Anamosa	52205	2010	63.16	74.8322	-11.6722
Ankeny	50021	2010	83.11	**83.5317**	-0.4217
Andrew Community School	51004	2010	90.48	74.5365	15.9435
Aplington-Parkersburg	50604	2010	73.47	**78.1391**	-4.6691
Atlantic	50022	2010	70.1	**75.0593**	-4.9593
Aurelia	51005	2010	70.59	80.3845	-9.7945
Ballard	50124	2010	76.36	**82.0617**	-5.7017
Battle Creek-Ida Grove	51006	2010	87.88	**80.0852**	7.7948
BCLUW	50621	2010	85.71	**77.6557**	8.0543
Belle Plaine	52208	2010	73.91	**77.6475**	-3.7375
Belmond-Klemme	50421	2010	72.97	**78.2062**	-5.2362
Benton	50835	2010	85.11	**83.0305**	2.0795

Bettendorf	52722	2010	82.87	**80.894**	1.976
Bondurant-Farrar	50035	2010	81.42	**83.6481**	-2.2281
Boone	50036	2010	84.5	**78.0408**	6.4592
Boyden-Hull	51239	2010	89.3	**85.6972**	3.6028
Burlington	52601	2010	73.08	**71.0793**	2.0007
Carroll	51401	2010	86.67	**78.4561**	8.2139
Calamus-Wheatland	52777	2010	80	**78.0661**	1.9339
Camanche	52730	2010	93.94	79.8952	14.0448
Cardinal	52246	2010	76.19	**80.8351**	-4.6451
Carlisle	50047	2010	84.03	**77.7043**	6.3257
Cedar Falls	50613	2010	82.37	**79.7506**	2.6194
Cedar Rapids	multiple	2010	71.06	**74.56502**	-3.50502
Center Point-Urbana	52213	2010	72.82	81.6156	-8.7956
Centerville	52544	2010	67.06	**72.6301**	-5.5701
Central City	52214	2010	65.63	80.4839	-14.8539
Central Decatur	50144	2010	77.08	**72.5571**	4.5229
Central Lee	52625	2010	84.51	**80.4544**	4.0556
Central Lyon Community School District	51246	2010	88.37	**81.8593**	6.5107
Central Clinton	52732	2010	77.08	**71.8163**	5.2637
Chariton	50049	2010	84.34	**77.554**	6.786
Charles City	50616	2010	86.59	75.1748	11.4152
Cherokee	51012	2010	76.06	**77.2005**	-1.1405
Clarinda	51632	2010	74.6	**73.6738**	0.9262
Clarke	50213	2010	69.05	**76.317**	-7.267
Clay Central-Everly	51338	2010	84	**82.1466**	1.8534
Clear Creek Amana	52340	2010	77.88	**78.2522**	-0.3722
Clear Lake	50428	2010	77.63	**76.9797**	0.6503

Clinton	52732	2010	69	**71.8163**	-2.8163
Colfax-Mingo	50054	2010	82.35	**76.0549**	6.2951
College	51637	2010	82.79	74.4281	8.3619
Collins-Maxwell	50055	2010	79.31	**79.3033**	0.0067
Colo-Nesco	50056	2010	83.87	**80.1241**	3.7459
Columbus Junction	52738	2010	48.08	75.8029	-27.7229
Coon Rapids-Bayard	50058	2010	73.08	**79.683**	-6.603
Corning	50841	2010	59.26	77.9445	-18.6845
Council Bluffs	mutliple	2010	70.46	**71.13545**	-0.67545
Creston	50801	2010	61.63	72.8869	-11.2569
Dallas Center-Grimes	50111	2010	83.06	**83.6975**	-0.6375
Danville	52623	2010	79.07	**79.1014**	-0.0314
Davenport	multiple	2010	70.5	**70.8269**	-0.3269
Davis County	52584	2010	84.34	**78.0524**	6.2876
Decorah Community	52101	2010	84.34	**81.7178**	2.6222
Denison	51442	2010	64.49	**72.2806**	-7.7906
Denver	50622	2010	77.08	**84.6571**	-7.5771
Des Moines Independent	multiple	2010	60.44	70.9549	-10.5149
Dunkerton	50626	2010	75.76	**80.9731**	-5.2131
Dike-New Hartford	50660	2010	88.89	**80.9579**	7.9321
Dubuque	multiple	2010	78.31	**76.7304**	1.5796
Durant	52747	2010	78.38	**76.0695**	2.3105
Eagle Grove	50533	2010	64.81	**71.1061**	-6.2961
Earlham	50072	2010	85.71	**84.3596**	1.3504
East Buchanan	50682	2010	72.22	81.9737	-9.7537

East Marshall	50106	2010	70.49	79.1501	-8.6601
Emmetsburg	50536	2010	75.68	**75.4143**	0.2657
Estherville Lincoln	51334	2010	76.54	**75.5573**	0.9827
Fairfield	52556	2010	77.19	**77.4567**	-0.2667
Forest City	50436	2010	91.03	77.1914	13.8386
Fort Dodge	50501	2010	65.78	**70.9025**	-5.1225
Fort Madison	52627	2010	86.36	72.1026	14.2574
Fremont-Mills Community School District	51653	2010	87.5	76.1865	11.3135
Galva-Holstein	51025	2010	91.18	80.9717	10.2083
Garner-Hayfield	50438	2010	77.42	**80.6039**	-3.1839
Gilbert	50105	2010	93.59	82.3922	11.1978
Grinnell-Newburg	50112	2010	72.12	**75.617**	-3.497
Grundy Center	50638	2010	82	**79.3559**	2.6441
Hampton-Dumont	50441	2010	78.02	**70.8702**	7.1498
Harlan	51537	2010	75	**78.21**	-3.21
Hartley-Melvin-Sanborn	51248	2010	91.84	80.4377	11.4023
Hinton	51024	2010	66.67	84.4738	-17.8038
Howard-Winneshiek	52136	2010	75	**77.906**	-2.906
Highland Community School District	52327	2010	71.11	83.689	-12.579
Hudson	50643	2010	79.07	**84.0919**	-5.0219
Humboldt	50548	2010	73.53	**76.7853**	-3.2553
Independence	50644	2010	75	**79.1254**	-4.1254
Indianola	50125	2010	83.61	**79.312**	4.298
Interstate 35	50257	2010	75	**79.2288**	-4.2288
Iowa City	multiple	2010	70.7	80.848	-10.148
Iowa Falls	50126	2010	81.94	**75.9414**	5.9986
Jefferson-Scranton	51462	2010	80.36	**80.2994**	0.0606

Jesup	50648	2010	88.16	**81.348**	6.812
Johnston	50131	2010	92.79	**84.811**	7.979
Keokuk	52632	2010	80.16	69.855	10.305
Kingsley-Pierson	51048	2010	77.78	**78.3096**	-0.5296
Knoxville	50138	2010	81.25	**75.2115**	6.0385
Lake Mills	50450	2010	73.33	**76.6311**	-3.3011
Lamoni	50140	2010	60	77.1748	-17.1748
Laurens-Marathon	50554	2010	68.42	**76.1384**	-7.7184
Le Mars	51031	2010	62.59	80.0855	-17.4955
Lenox	50851	2010	85.19	74.6047	10.5853
Linn-Mar	52302	2010	77.01	**78.8323**	-1.8223
Lisbon	52253	2010	88.1	**79.9927**	8.1073
Lone Tree	52755	2010	90.48	80.5513	9.9287
Lynnville-Sully	50251	2010	82.86	**85.0797**	-2.2197
Madrid	50156	2010	71.43	**78.9622**	-7.5322
Maquoketa	52060	2010	72.16	**72.4255**	-0.2655
Marshalltown	50158	2010	63.18	73.3275	-10.1475
Mason City	50401	2010	79.29	**75.3322**	3.9578
MOC-Floyd Valley	51041	2010	92.94	84.6726	8.2674
Mediapolis	52637	2010	92.16	79.1851	12.9749
Midland	52362	2010	81.82	**77.6033**	4.2167
Mid-Prairie	52356	2010	75	**81.9356**	-6.9356
Missouri Valley	51555	2010	87.04	77.5568	9.4832
Montezuma	50171	2010	88.57	76.9023	11.6677
Monticello	52310	2010	82.76	**80.4872**	2.2728
Moravia	52571	2010	55.56	79.5261	-23.9661

Mount Pleasant	52641	2010	80.85	**87.0352**	-6.1852
Muscatine	52761	2010	89.08	**82.634**	6.446
Nevada	50201	2010	87.72	77.7509	9.9691
Newell-Fonda	50540	2010	78.95	**83.8769**	-4.9269
Newton	50208	2010	75.6	**75.4445**	0.1555
North Fayette	52142	2010	92.16	80.3322	11.8278
North Linn	52245	2010	77.36	**80.9302**	-3.5702
North Polk	50226	2010	82.42	**86.8019**	-4.3819
North Scott	52748	2010	84.19	**79.9757**	4.2143
Norwalk	50211	2010	81.1	**80.5306**	0.5694
Oelwein	50662	2010	70	**71.3263**	-1.3263
Ogden	50212	2010	86.67	**80.4964**	6.1736
Okoboji	51355	2010	91.43	81.3554	10.0746
Osage	50461	2010	80.65	**79.4606**	1.1894
Oskaloosa	52577	2010	80.37	**74.0081**	6.3619
Ottumwa	52501	2010	65.24	**70.7746**	-5.5346
Panorama Community School District	50216	2010	84	**81.9607**	2.0393
Pekin	52580	2010	95.35	86.8197	8.5303
Pella	50219	2010	94.87	83.8706	10.9994
Perry	50220	2010	64.86	**71.5307**	-6.6707
Postville	52162	2010	62.07	74.3296	-12.2596
Saydel	50313	2010	70.73	**69.8384**	0.8916
Shenandoah	51601	2010	83.61	74.904	8.706
Southeast Polk	50327	2010	79.18	**79.3379**	-0.1579
Urbandale	50322	2010	85.06	**80.6463**	4.4137
Waterloo	50701	2010	59.91	**64.0195**	-4.1095
Waukee	50263	2010	88.81	**82.3453**	6.4647
Webster City	50595	2010	75.28	**73.726**	1.554

West Burlington Ind	52655	2010	79.17	**75.3295**	3.8405
West Des Moines	multiple	2010	79.08	**79.6611**	-0.5811
Western Dubuque	52046	2010	70.97	80.9693	-9.9993
Winterset	50273	2010	71.07	81.1567	-10.0867
Woodward-Granger	50276	2010	92.86	79.4379	13.4221
				SEE = 8.1	
				112/160	
				70%	

Appendix C

Predictive District 2010 ITBS 3rd Grade Mathematics Scores

District Name	Zip Code	Year	3rd Grade Mathematics % Proficient	Predicted	Diff
AGWSR	50601	2010	68.75	**75.4906**	-6.7406
Adair-Casey	50002	2010	62.96	81.2116	-18.2516
Adel DeSoto Minburn	50003	2010	79.09	**81.6073**	-2.5173
Akron Westfield	51001	2010	75.86	**81.2002**	-5.3402
Albia	52531	2010	68.29	77.8975	-9.6075
Algona	50511	2010	80	**81.0895**	-1.0895
Allamakee	52140	2010	82.35	**82.2904**	0.0596
Alta	51002	2010	76.32	**77.8975**	-1.5775
Ames	50010	2010	86.67	**84.6745**	1.9955
Anamosa	52205	2010	80.56	**76.8061**	3.7539
Ankeny	50021	2010	85.78	**83.0347**	2.7453
Andrew Community School	51004	2010	61.9	73.342	-11.442
Aplington-Parkersburg	50604	2010	73.47	**78.8275**	-5.3575
Atlantic	50022	2010	76.53	**78.0019**	-1.4719
Aurelia	51005	2010	82.35	**81.9202**	0.4298
Ballard	50124	2010	64.22	80.0095	-15.7895
Battle Creek-Ida Grove	51006	2010	84.85	**78.8173**	6.0327
BCLUW	50621	2010	71.43	**79.1812**	-7.7512
Belle Plaine	52208	2010	73.91	**79.1176**	-5.2076
Belmond-Klemme	50421	2010	86.49	**79.9954**	6.4946
Benton	50835	2010	85.11	**87.6043**	-2.4943
Bettendorf	52722	2010	85.66	**81.5068**	4.1532
Bondurant-Farrar	50035	2010	70.8	**80.9827**	-10.1827
Boone	50036	2010	79.23	**79.6303**	-0.4003

Boyden-Hull	51239	2010	84.78	**82.7992**	1.9808
Burlington	52601	2010	80.77	**74.5378**	6.2322
Carroll	51401	2010	76.67	**80.2117**	-3.5417
Calamus-Wheatland	52777	2010	100	77.1457	22.8543
Camanche	52730	2010	95.52	81.8605	13.6595
Cardinal	52246	2010	80.95	**84.6058**	-3.6558
Carlisle	50047	2010	73.61	**78.1165**	-4.5065
Cedar Falls	50613	2010	87.78	**82.4698**	5.3102
Cedar Rapids	multiple	2010	87.78	77.50186	10.27814
Center Point-Urbana	52213	2010	76.47	**79.5196**	-3.0496
Centerville	52544	2010	68.24	**75.5962**	-7.3562
Central City	52214	2010	64.52	80.62	-16.1
Central Decatur	50144	2010	75	**76.0249**	-1.0249
Central Lee	52625	2010	85.92	**81.7612**	4.1588
Central Lyon Community School District	51246	2010	95.35	82.1632	13.1868
Central Clinton	52732	2010	86	74.2528	11.7472
Chariton	50049	2010	82.29	**78.769**	3.521
Charles City	50616	2010	81.93	**77.8645**	4.0655
Cherokee	51012	2010	74.65	**79.2652**	-4.6152
Clarinda	51632	2010	61.09	77.914	-16.824
Clarke	50213	2010	71.43	**77.8111**	-6.3811
Clay Central-Everly	51338	2010	84.62	**81.1276**	3.4924
Clear Creek Amana	52340	2010	77.88	**80.4904**	-2.6104
Clear Lake	50428	2010	75.32	**79.7791**	-4.4591
Clinton	52732	2010	79.18	**74.2528**	4.9272
Colfax-Mingo	50054	2010	76.47	**76.7221**	-0.2521
College	51637	2010	81.23	**74.6179**	6.6121
Collins-Maxwell	50055	2010	90	78.9955	11.0045

Colo-Nesco	50056	2010	83.87	**80.8618**	3.0082
Columbus Junction	52738	2010	71.15	**75.7819**	-4.6319
Coon Rapids-Bayard	50058	2010	76.92	**80.2168**	-3.2968
Corning	50841	2010	74.07	**80.1544**	-6.0844
Council Bluffs	mutliple	2010	73.26	**73.8775**	-0.6175
Creston	50801	2010	58.14	75.0835	-16.9435
Dallas Center-Grimes	50111	2010	79.03	**81.6061**	-2.5761
Danville	52623	2010	74.42	**79.6507**	-5.2307
Davenport	multiple	2010	72.03	**74.3152**	-2.2852
Davis County	52584	2010	85.54	74.8228	10.7172
Decorah Community	52101	2010	83.7	**83.3107**	0.3893
Denison	51442	2010	65.42	**72.4933**	-7.0733
Denver	50622	2010	89.58	**84.5206**	5.0594
Des Moines Independent	multiple	2010	61.31	73.99582	-12.68582
Dunkerton	50626	2010	75.76	**80.47**	-4.71
Dike-New Hartford	50660	2010	92.59	81.592	10.998
Dubuque	multiple	2010	81.28	**78.3187**	2.9613
Durant	52747	2010	75.68	**78.3442**	-2.6642
Eagle Grove	50533	2010	77.78	**72.4984**	5.2816
Earlham	50072	2010	67.35	82.0411	-14.6911
East Buchanan	50682	2010	74.29	**79.9585**	-5.6685
East Marshall	50106	2010	73.77	**82.2688**	-8.4988
Emmetsburg	50536	2010	56.76	77.8021	-21.0421
Estherville Lincoln	51334	2010	82.5	**78.8644**	3.6356
Fairfield	52556	2010	80.7	**81.2956**	-0.5956
Forest City	50436	2010	93.95	78.5209	15.4291

Fort Dodge	50501	2010	64.29	74.5861	-10.2961
Fort Madison	52627	2010	83.97	74.5645	9.4055
Fremont-Mills Community School District	51653	2010	95.83	77.7475	18.0825
Galva-Holstein	51025	2010	79.41	**82.8031**	-3.3931
Garner-Hayfield	50438	2010	87.1	**81.6544**	5.4456
Gilbert	50105	2010	92.31	80.7919	11.5181
Grinnell-Newburg	50112	2010	81.74	**76.9588**	4.7812
Grundy Center	50638	2010	80	**81.0997**	-1.0997
Hampton-Dumont	50441	2010	79.12	**72.4156**	6.7044
Harlan	51537	2010	84.85	**80.6455**	4.2045
Hartley-Melvin-Sanborn	51248	2010	93.88	82.1848	11.6952
Hinton	51024	2010	71.11	83.1733	-12.0633
Howard-Winneshiek	52136	2010	72.41	**78.5833**	-6.1733
Highland Community School District	52327	2010	57.78	82.3693	-24.5893
Hudson	50643	2010	86.05	**83.2522**	2.7978
Humboldt	50548	2010	82.35	**78.6736**	3.6764
Independence	50644	2010	82.61	**80.8516**	1.7584
Indianola	50125	2010	73.53	**80.3008**	-6.7708
Interstate 35	50257	2010	65	76.9612	-11.9612
Iowa City	multiple	2010	72.95	84.4366	-11.4866
Iowa Falls	50126	2010	83.1	**77.9434**	5.1566
Jefferson-Scranton	51462	2010	92.73	80.5321	12.1979
Jesup	50648	2010	61.84	79.9204	-18.0804
Johnston	50131	2010	91.63	**82.7701**	8.8599
Keokuk	52632	2010	80.16	**72.7198**	7.4402
Kingsley-Pierson	51048	2010	63.89	77.5237	-13.6337
Knoxville	50138	2010	79.53	**77.1814**	2.3486
Lake Mills	50450	2010	76.67	**79.0171**	-2.3471

Lamoni	50140	2010	80	**80.3491**	-0.3491
Laurens-Marathon	50554	2010	52.63	77.839	-25.209
Le Mars	51031	2010	71.22	**79.9522**	-8.7322
Lenox	50851	2010	77.78	**76.3912**	1.3888
Linn-Mar	52302	2010	88.17	**79.4497**	8.7203
Lisbon	52253	2010	85.71	**78.811**	6.899
Lone Tree	52755	2010	76.19	**80.8084**	-4.6184
Lynnville-Sully	50251	2010	88.57	**85.6171**	2.9529
Madrid	50156	2010	80.95	**79.7893**	1.1607
Maquoketa	52060	2010	91.3	75.4054	15.8946
Marshalltown	50158	2010	90.91	75.2947	15.6153
Mason City	50401	2010	75.36	**77.9485**	-2.5885
MOC-Floyd Valley	51041	2010	90.59	**84.5485**	6.0415
Mediapolis	52637	2010	88.24	**80.8516**	7.3884
Midland	52362	2010	78.79	**77.8351**	0.9549
Mid-Prairie	52356	2010	83	**83.2573**	-0.2573
Missouri Valley	51555	2010	87.04	**78.2983**	8.7417
Montezuma	50171	2010	88.57	77.3212	11.2488
Monticello	52310	2010	77.59	**81.391**	-3.801
Moravia	52571	2010	55.56	81.8287	-26.2687
Mount Pleasant	52641	2010	78.72	**77.8213**	0.8987
Muscatine	52761	2010	91.04	73.7083	17.3317
Nevada	50201	2010	89.09	79.0057	10.0843
Newell-Fonda	50540	2010	73.68	84.2458	-10.5658
Newton	50208	2010	74.76	**77.7373**	-2.9773
North Fayette	52142	2010	93.88	83.5384	10.3416
North Linn	52245	2010	90.57	**84.3361**	6.2339
North Polk	50226	2010	80	**83.4571**	-3.4571
North Scott	52748	2010	89.72	79.5439	10.1761

Norwalk	50211	2010	82.21	**78.3646**	3.8454
Oelwein	50662	2010	78.75	**73.8202**	4.9298
Ogden	50212	2010	86.76	**81.0679**	5.6921
Okoboji	51355	2010	94.29	84.9862	9.3038
Osage	50461	2010	77.42	**80.545**	-3.125
Oskaloosa	52577	2010	90.18	76.4842	13.6958
Ottumwa	52501	2010	65.24	**72.9589**	-7.7189
Panorama Community School District	50216	2010	86	**83.3578**	2.6422
Pekin	52580	2010	90.7	**85.7266**	4.9734
Pella	50219	2010	92.95	**83.887**	9.063
Perry	50220	2010	67.57	**71.5405**	-3.9705
Postville	52162	2010	75.86	**76.1179**	-0.2579
Saydel	50313	2010	67.9	**72.6829**	-4.7829
Shenandoah	51601	2010	75.41	**77.8378**	-2.4278
Southeast Polk	50327	2010	80.41	**79.5019**	0.9081
Urbandale	50322	2010	86.72	**82.2574**	4.4626
Waterloo	50701	2010	57.25	68.7328	-11.4828
Waukee	50263	2010	87.91	**80.7817**	7.1283
Webster City	50595	2010	71.91	**75.5542**	-3.6442
West Burlington Ind	52655	2010	87.5	**79.1164**	8.3836
West Des Moines	multiple	2010	81.77	**81.3478**	0.4222
Western Dubuque	52046	2010	84.95	**80.1175**	4.8325
Winterset	50273	2010	70.25	81.3592	-11.1092
Woodward-Granger	50276	2010	93.48	80.2078	13.2722
				SEE = 9.0	
				114/160	
				71%	

Appendix D

Predictive District 2010 ITED 11th Grade Language Arts Scores

District Name	Zip Code	Year	11th Grade Reading % Proficient	Predicted	Diff
AGWSR	50601	2010	85.11	77.183	7.927
Adair-Casey	50002	2010	53.57	79.983	-26.413
Adel DeSoto Minburn	50003	2010	88.89	**83.174**	5.716
Akron Westfield	51001	2010	97.06	81.4395	15.6205
Albia	52531	2010	87.63	80.374	7.256
Algona	50511	2010	81.73	**81.311**	0.419
Allamakee	52140	2010	80.3	**82.769**	-2.469
Alta	51002	2010	81.08	**80.374**	0.706
Ames	50010	2010	93.65	87.003	6.647
Anamosa	52205	2010	77.55	**77.216**	0.334
Ankeny	50021	2010	90.37	**86.8125**	3.5575
Andrew Community School	51004	2010	76.92	**74.0995**	2.8205
Aplington-Parkersburg	50604	2010	82	**77.7355**	4.2645
Atlantic	50022	2010	74.53	**77.5955**	-3.0655
Aurelia	51005	2010	92.31	81.8585	10.4515
Ballard	50124	2010	75.93	**82.1495**	-6.2195
Battle Creek-Ida Grove	51006	2010	78.95	**79.718**	-0.768
BCLUW	50621	2010	78.95	**79.1165**	-0.1665
Belle Plaine	52208	2010	80	**79.4845**	0.5155
Belmond-Klemme	50421	2010	70.69	79.709	-9.019
Benton	50835	2010	80	**83.7845**	-3.7845
Bettendorf	52722	2010	85.71	**84.037**	1.673
Bondurant-Farrar	50035	2010	81.4	**83.7365**	-2.3365

Boone	50036	2010	77.7	**79.728**	-2.028
Boyden-Hull	51239	2010	78	**82.46**	-4.46
Burlington	52601	2010	74.11	**75.7005**	-1.5905
Carroll	51401	2010	85.38	**80.0945**	5.2855
Calamus-Wheatland	52777	2010	81.58	**78.7785**	2.8015
Camanche	52730	2010	82.46	**80.426**	2.034
Cardinal	52246	2010	80	**85.8645**	-5.8645
Carlisle	50047	2010	83.49	**79.1155**	4.3745
Cedar Falls	50613	2010	92.08	84.096	7.984
Cedar Rapids	multiple	2010	80.82	**79.4596**	1.3604
Center Point-Urbana	52213	2010	82.35	**81.446**	0.904
Centerville	52544	2010	81.31	**76.1575**	5.1525
Central City	52214	2010	78.13	**79.7745**	-1.6445
Central Decatur	50144	2010	77.5	**75.5725**	1.9275
Central Lee	52625	2010	71.59	80.901	-9.311
Central Lyon Community School District	51246	2010	92.68	81.8775	10.8025
Central Clinton	52732	2010	77.5	**75.4815**	2.0185
Chariton	50049	2010	74.75	**78.66**	-3.91
Charles City	50616	2010	83.87	**77.397**	6.473
Cherokee	51012	2010	80.6	**79.7675**	0.8325
Clarinda	51632	2010	80.6	**76.966**	3.634
Clarke	50213	2010	83.78	**77.306**	6.474
Clay Central-Everly	51338	2010	85.71	**82.462**	3.248
Clear Creek Amana	52340	2010	84.21	**81.084**	3.126
Clear Lake	50428	2010	77	**80.7905**	-3.7905
Clinton	52732	2010	73.86	**75.4815**	-1.6215
Colfax-Mingo	50054	2010	70.77	**76.5925**	-5.8225
College	51637	2010	83.16	**76.5985**	6.5615

Collins-Maxwell	50055	2010	81.63	**79.7055**	1.9245
Colo-Nesco	50056	2010	68.97	81.4135	-12.4435
Columbus Junction	52738	2010	69.49	76.6015	-7.1115
Coon Rapids-Bayard	50058	2010	78.57	**80.528**	-1.958
Corning	50841	2010	88.57	79.6325	8.9375
Council Bluffs	mutliple	2010	69.62	**75.17225**	-5.55225
Creston	50801	2010	72.92	**76.4115**	-3.4915
Dallas Center-Grimes	50111	2010	85.83	**84.8515**	0.9785
Danville	52623	2010	80.56	**80.347**	0.213
Davenport	multiple	2010	68.53	76.2005	-7.6705
Davis County	52584	2010	77.33	**76.853**	0.477
Decorah Community	52101	2010	90.58	83.508	7.072
Denison	51442	2010	91.3	73.766	17.534
Denver	50622	2010	91.3	84.4005	6.8995
Des Moines Independent	multiple	2010	59.76	76.2101	-16.4501
Dunkerton	50626	2010	74.19	**79.7665**	-5.5765
Dike-New Hartford	50660	2010	86.79	**80.5325**	6.2575
Dubuque	multiple	2010	75.33	**79.6955**	-4.3655
Durant	52747	2010	84.13	**77.6725**	6.4575
Eagle Grove	50533	2010	72.31	**73.3125**	-1.0025
Earlham	50072	2010	72.22	83.202	-10.982
East Buchanan	50682	2010	70	81.2405	-11.2405
East Marshall	50106	2010	82.81	**81.0005**	1.8095
Emmetsburg	50536	2010	86.67	78.0875	8.5825
Estherville Lincoln	51334	2010	81.9	**77.7965**	4.1035

Fairfield	52556	2010	83.05	**81.6695**	1.3805
Forest City	50436	2010	78	**79.922**	-1.922
Fort Dodge	50501	2010	70.19	**75.4735**	-5.2835
Fort Madison	52627	2010	73.13	**75.605**	-2.475
Fremont-Mills Community School District	51653	2010	75.76	**78.3675**	-2.6075
Galva-Holstein	51025	2010	77.78	**82.9375**	-5.1575
Garner-Hayfield	50438	2010	79.37	**81.3635**	-1.9935
Gilbert	50105	2010	83.33	**83.186**	0.144
Grinnell-Newburg	50112	2010	87.5	78.611	8.889
Grundy Center	50638	2010	74.42	81.4105	-6.9905
Hampton-Dumont	50441	2010	73.63	**73.861**	-0.231
Harlan	51537	2010	89.47	80.305	9.165
Hartley-Melvin-Sanborn	51248	2010	80.39	**80.1115**	0.2785
Hinton	51024	2010	86.79	**83.484**	3.306
Howard-Winneshiek	52136	2010	80.39	**78.509**	1.881
Highland Community School District	52327	2010	66.67	81.651	-14.981
Hudson	50643	2010	81.25	**85.5325**	-4.2825
Humboldt	50548	2010	82.02	**79.6565**	2.3635
Independence	50644	2010	80.39	**80.718**	-0.328
Indianola	50125	2010	89.67	81.532	8.138
Interstate 35	50257	2010	88.71	78.219	10.491
Iowa City	multiple	2010	82.52	**85.904**	-3.384
Iowa Falls	50126	2010	79.55	**78.119**	1.431
Jefferson-Scranton	51462	2010	74.68	**80.188**	-5.508
Jesup	50648	2010	82.43	**79.922**	2.508
Johnston	50131	2010	86.08	**86.119**	-0.039
Keokuk	52632	2010	59.39	73.493	-14.103
Kingsley-Pierson	51048	2010	75	**79.576**	-4.576

Knoxville	50138	2010	78.38	**77.4235**	0.9565
Lake Mills	50450	2010	82.98	**79.0765**	3.9035
Lamoni	50140	2010	65.38	80.958	-15.578
Laurens-Marathon	50554	2010	80.95	**79.239**	1.711
Le Mars	51031	2010	81.71	**80.2085**	1.5015
Lenox	50851	2010	77.77	**76.3285**	1.4415
Linn-Mar	52302	2010	88.46	81.6855	6.7745
Lisbon	52253	2010	77.5	**79.4455**	-1.9455
Lone Tree	52755	2010	86.36	**81.5085**	4.8515
Lynnville-Sully	50251	2010	82.93	**83.2225**	-0.2925
Madrid	50156	2010	79.59	**79.384**	0.206
Maquoketa	52060	2010	71.79	**75.4075**	-3.6175
Marshalltown	50158	2010	60.96	76.2065	- 15.2465
Mason City	50401	2010	80	**78.525**	1.475
MOC-Floyd Valley	51041	2010	94	85.02	8.98
Mediapolis	52637	2010	87.5	80.0765	7.4235
Midland	52362	2010	71.88	79.3335	-7.4535
Mid-Prairie	52356	2010	80.65	**81.572**	-0.922
Missouri Valley	51555	2010	84.29	**78.899**	5.391
Montezuma	50171	2010	87.5	78.2155	9.2845
Monticello	52310	2010	74	81.68	-7.68
Moravia	52571	2010	92	81.0025	10.9975
Mount Pleasant	52641	2010	71.43	79.071	-7.641
Muscatine	52761	2010	75.35	**75.178**	0.172
Nevada	50201	2010	81.55	**79.6355**	1.9145
Newell-Fonda	50540	2010	87.5	**83.0695**	4.4305
Newton	50208	2010	71.24	78.1765	-6.9365
North Fayette	52142	2010	87.5	**82.781**	4.719

North Linn	52245	2010	73.77	85.97	-12.2
North Polk	50226	2010	81.71	**86.4925**	-4.7825
North Scott	52748	2010	81.82	**81.6945**	0.1255
Norwalk	50211	2010	87.36	**81.653**	5.707
Oelwein	50662	2010	87.1	74.8575	12.2425
Ogden	50212	2010	79.69	**81.383**	-1.693
Okoboji	51355	2010	88.71	**86.9**	1.81
Osage	50461	2010	83.52	**80.4**	3.12
Oskaloosa	52577	2010	78.31	**77.8085**	0.5015
Ottumwa	52501	2010	71.82	**74.231**	-2.411
Panorama Community School District	50216	2010	83.05	**83.3915**	-0.3415
Pekin	52580	2010	72.34	85.2575	-12.9175
Pella	50219	2010	89.29	**84.631**	4.659
Perry	50220	2010	73.73	**74.0775**	-0.3475
Postville	52162	2010	82.05	**76.469**	5.581
Saydel	50313	2010	67.71	**73.621**	-5.911
Shenandoah	51601	2010	76.82	**78.317**	-1.497
Southeast Polk	50327	2010	74.55	**80.8125**	-6.2625
Urbandale	50322	2010	79.41	**84.9005**	-5.4905
Waterloo	50701	2010	70.83	**70.3135**	0.5165
Waukee	50263	2010	89.05	**85.9195**	3.1305
Webster City	50595	2010	72.73	**76.714**	-3.984
West Burlington Ind	52655	2010	82.35	**77.8635**	4.4865
West Des Moines	multiple	2010	87.44	**85.2845**	2.1555
Western Dubuque	52046	2010	78.74	**79.0345**	-0.2945
Winterset	50273	2010	80.67	**80.9025**	-0.2325
Woodward-Granger	50276	2010	78.43	**81.4415**	-3.0115

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73%

Appendix E

Predictive District 2010 ITED 11th Grade Mathematics Scores

District Name	Zip Code	Year	11th Grade Mathematics % Proficient	Predicted	Diff
AGWSR	50601	2010	82.98	75.5676	7.4124
Adair-Casey	50002	2010	71.43	80.798	-9.368
Adel DeSoto Minburn	50003	2010	84.85	**82.2816**	2.5684
Akron Westfield	51001	2010	79.41	**82.287**	-2.877
Albia	52531	2010	86.6	78.3192	8.2808
Algona	50511	2010	82.69	**81.9396**	0.7504
Allamakee	52140	2010	78.03	**84.4524**	-6.4224
Alta	51002	2010	78.38	**78.3192**	0.0608
Ames	50010	2010	91.11	**84.9284**	6.1816
Anamosa	52205	2010	81.82	**77.632**	4.188
Ankeny	50021	2010	91	**83.8122**	7.1878
Andrew Community School	51004	2010	92.31	75.4574	16.8526
Aplington-Parkersburg	50604	2010	92	79.4862	12.5138
Atlantic	50022	2010	71.03	78.2398	-7.2098
Aurelia	51005	2010	84.62	**82.4642**	2.1558
Ballard	50124	2010	73.15	80.9574	-7.8074
Battle Creek-Ida Grove	51006	2010	85.71	**81.288**	4.422
BCLUW	50621	2010	86.84	79.2674	7.5726
Belle Plaine	52208	2010	82.22	**80.1394**	2.0806
Belmond-Klemme	50421	2010	63.79	80.57	-16.78
Benton	50835	2010	78.46	86.8226	-8.3626
Bettendorf	52722	2010	83.98	**82.0428**	1.9372
Bondurant-Farrar	50035	2010	73.26	81.6322	-8.3722
Boone	50036	2010	82.43	**80.248**	2.182

Boyden-Hull	51239	2010	86	**82.9688**	3.0312
Burlington	52601	2010	71.53	**74.9906**	-3.4606
Carroll	51401	2010	89.23	80.5538	8.6762
Calamus-Wheatland	52777	2010	89.19	78.9362	10.2538
Camanche	52730	2010	87.72	**82.7792**	4.9408
Cardinal	52246	2010	74	84.373	-10.373
Carlisle	50047	2010	79.82	**78.9854**	0.8346
Cedar Falls	50613	2010	87.13	**82.4896**	4.6404
Cedar Rapids	multiple	2010	76.54	**77.88912**	-1.34912
Center Point-Urbana	52213	2010	85.29	**80.4976**	4.7924
Centerville	52544	2010	71.96	**76.0398**	-4.0798
Central City	52214	2010	71.88	81.697	-9.817
Central Decatur	50144	2010	80	**75.4898**	4.5102
Central Lee	52625	2010	70.93	82.3756	-11.4456
Central Lyon Community School District	51246	2010	85.37	**82.495**	2.875
Central Clinton	52732	2010	86.23	75.1678	11.0622
Chariton	50049	2010	86.85	**79.8752**	6.9748
Charles City	50616	2010	79.03	**78.2036**	0.8264
Cherokee	51012	2010	82.19	**80.523**	1.667
Clarinda	51632	2010	83.58	76.3472	7.2328
Clarke	50213	2010	90.54	78.5872	11.9528
Clay Central-Everly	51338	2010	85.71	**82.408**	3.302
Clear Creek Amana	52340	2010	84.96	**80.308**	4.652
Clear Lake	50428	2010	82	**79.8698**	2.1302
Clinton	52732	2010	71.43	**75.1678**	-3.7378
Colfax-Mingo	50054	2010	76.92	**77.6898**	-0.7698
College	51637	2010	82.81	**76.9226**	5.8874

Collins-Maxwell	50055	2010	85.71	**80.5646**	5.1454
Colo-Nesco	50056	2010	62.07	81.8926	-19.8226
Columbus Junction	52738	2010	67.8	76.8918	-9.0918
Coon Rapids-Bayard	50058	2010	71.43	81.7424	-10.3124
Corning	50841	2010	80	**80.6586**	-0.6586
Council Bluffs	mutliple	2010	65.92	74.3193	-8.3993
Creston	50801	2010	67.71	75.8118	-8.1018
Dallas Center-Grimes	50111	2010	84.92	**82.327**	2.593
Danville	52623	2010	77.78	**80.4652**	-2.6852
Davenport	multiple	2010	70.1	**74.6994**	-4.5994
Davis County	52584	2010	78.67	**78.0372**	0.6328
Decorah Community	52101	2010	91.3	83.8392	7.4608
Denison	51442	2010	66.41	**73.192**	-6.782
Denver	50622	2010	84.78	**84.9538**	-0.1738
Des Moines Independent	multiple	2010	56.7	74.3186	-17.6186
Dunkerton	50626	2010	67.74	81.4042	-13.6642
Dike-New Hartford	50660	2010	83.33	**81.8202**	1.5098
Dubuque	multiple	2010	72.53	**78.8206**	-6.2906
Durant	52747	2010	82.54	**78.4354**	4.1046
Eagle Grove	50533	2010	69.23	**73.6642**	-4.4342
Earlham	50072	2010	81.48	**83.2784**	-1.7984
East Buchanan	50682	2010	80.49	**81.9666**	-1.4766
East Marshall	50106	2010	82.81	**81.6538**	1.1562
Emmetsburg	50536	2010	76.67	**78.075**	-1.405
Estherville Lincoln	51334	2010	74.29	**78.209**	-3.919

Fairfield	52556	2010	79.66	**81.4566**	-1.7966
Forest City	50436	2010	85.86	**79.2528**	6.6072
Fort Dodge	50501	2010	71.05	**74.7318**	-3.6818
Fort Madison	52627	2010	71.07	**75.754**	-4.684
Fremont-Mills Community School District	51653	2010	78.79	**78.3846**	0.4054
Galva-Holstein	51025	2010	72.22	82.8894	-10.6694
Garner-Hayfield	50438	2010	82.54	**82.307**	0.233
Gilbert	50105	2010	90.91	80.7856	10.1244
Grinnell-Newburg	50112	2010	90.76	78.846	11.914
Grundy Center	50638	2010	81.4	**81.5706**	-0.1706
Hampton-Dumont	50441	2010	68.13	**72.602**	-4.472
Harlan	51537	2010	88.72	80.7148	8.0052
Hartley-Melvin-Sanborn	51248	2010	84.31	**82.3086**	2.0014
Hinton	51024	2010	83.33	**84.4**	-1.07
Howard-Winneshiek	52136	2010	82.35	**79.7396**	2.6104
Highland Community School District	52327	2010	86.84	**83.6836**	3.1564
Hudson	50643	2010	79.69	**84.2282**	-4.5382
Humboldt	50548	2010	86.52	**79.3922**	7.1278
Independence	50644	2010	88.24	**81.3064**	6.9336
Indianola	50125	2010	85.45	**80.8488**	4.6012
Interstate 35	50257	2010	87.1	78.0388	9.0612
Iowa City	multiple	2010	79.64	**84.2952**	-4.6552
Iowa Falls	50126	2010	84.09	**78.8676**	5.2224
Jefferson-Scranton	51462	2010	73.42	81.476	-8.056
Jesup	50648	2010	81.08	**81.6176**	-0.5376
Johnston	50131	2010	87.88	**83.3708**	4.5092
Keokuk	52632	2010	52.44	73.2844	-20.8444

Kingsley-Pierson	51048	2010	89.29	80.288	9.002
Knoxville	50138	2010	81.76	**77.8238**	3.9362
Lake Mills	50450	2010	85.11	**79.6618**	5.4482
Lamoni	50140	2010	65.38	80.3512	-14.9712
Laurens-Marathon	50554	2010	83.33	**78.8276**	4.5024
Le Mars	51031	2010	80	**81.301**	-1.301
Lenox	50851	2010	63.64	76.841	-13.201
Linn-Mar	52302	2010	91.28	80.107	11.173
Lisbon	52253	2010	87.5	79.5478	7.9522
Lone Tree	52755	2010	81.82	**81.7986**	0.0214
Lynnville-Sully	50251	2010	90.24	**85.0386**	5.2014
Madrid	50156	2010	79.59	**79.9784**	-0.3884
Maquoketa	52060	2010	87.04	75.7902	11.2498
Marshalltown	50158	2010	61.99	75.801	-13.811
Mason City	50401	2010	76.08	**78.7428**	-2.6628
MOC-Floyd Valley	51041	2010	94	84.3584	9.6416
Mediapolis	52637	2010	83.33	**80.9482**	2.3818
Midland	52362	2010	87.5	78.907	8.593
Mid-Prairie	52356	2010	79.57	**83.0288**	-3.4588
Missouri Valley	51555	2010	80	**79.2004**	0.7996
Montezuma	50171	2010	95.83	78.8438	16.9862
Monticello	52310	2010	81	**82.1784**	-1.1784
Moravia	52571	2010	76	**82.857**	-6.857
Mount Pleasant	52641	2010	73.47	**79.054**	-5.584
Muscatine	52761	2010	77.31	**74.54**	2.77
Nevada	50201	2010	83.5	**79.3598**	4.1402
Newell-Fonda	50540	2010	80	**85.359**	-5.359
Newton	50208	2010	75.97	**78.3954**	-2.4254

North Fayette	52142	2010	77.27	**83.7668**	-6.4968
North Linn	52245	2010	77.05	84.2952	-7.2452
North Polk	50226	2010	84.15	**84.7458**	-0.5958
North Scott	52748	2010	81.97	**80.1578**	1.8122
Norwalk	50211	2010	86.78	**80.4436**	6.3364
Oelwein	50662	2010	75.27	**74.4838**	0.7862
Ogden	50212	2010	84.38	**82.126**	2.254
Okoboji	51355	2010	90.32	**86.3504**	3.9696
Osage	50461	2010	82.42	**81.4312**	0.9888
Oskaloosa	52577	2010	74.6	**76.8178**	-2.2178
Ottumwa	52501	2010	74.83	**73.514**	1.316
Panorama Community School District	50216	2010	77.97	**83.8646**	-5.8946
Pekin	52580	2010	68.09	87.103	-19.013
Pella	50219	2010	89.88	**83.9116**	5.9684
Perry	50220	2010	73.73	**73.0926**	0.6374
Postville	52162	2010	84.62	76.5412	8.0788
Saydel	50313	2010	64.58	72.89	-8.31
Shenandoah	51601	2010	75.32	**78.5148**	-3.1948
Southeast Polk	50327	2010	75.28	**80.3658**	-5.0858
Urbandale	50322	2010	82.35	**82.5458**	-0.1958
Waterloo	50701	2010	64.98	**68.5046**	-3.5246
Waukee	50263	2010	86.93	**81.3934**	5.5366
Webster City	50595	2010	81.82	**76.3672**	5.4528
West Burlington Ind	52655	2010	70.59	79.5878	-8.9978
West Des Moines	multiple	2010	83.93	**81.7154**	2.2146
Western Dubuque	52046	2010	83.07	**80.2642**	2.8058
Winterset	50273	2010	77.31	**81.7786**	-4.4686
Woodward-Granger	50276	2010	82.35	**81.2302**	1.1198

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69%